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Summit Showcase Displays and Ecosystem Case Studies

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Summit Showcase Displays and Ecosystem Case Studies

presented at the
Bureau Of Land Management
Summit
Incline Village, Nevada.
on
April, 1994

Prepared by
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Alaska State Office
October, 1994

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FOREWORD

The West has changed from a sparsely populated region with few resource conflicts, to a rapidly growing one that faces new demands for public land uses. As a result, the ways of managing the public lands need to change with the times, as Secretary Babbitt pointed out at the Bureau of Land Management's April 1994 Summit. What is needed, the Secretary said, is a style of management that looks at the landscape's "big picture" rather than isolated parts of it.

To meet the needs and demands of the still-changing West, the BLM has developed its "Blueprint for the Future." This blueprint describes the BLM's top five goals, which are:

- Maintaining Healthy Ecosystems;
- Serving Current and Future Publics;
- Promoting Collaborative Leadership;
- Improving Business Practices; and
- Improving Human Resource Management Practices.

To measure our progress as we work toward these goals, the BLM has prepared case studies that show what has been accomplished thus far. The case studies cited in this publication demonstrate that we are:

- Becoming more aware of the overall health of the land.
- Working more effectively with new and traditional land users.
- Helping local communities deal with changing environmental, social, and economic conditions.
- Working across larger geographic units while protecting significant natural and cultural resources.
- Becoming more efficient and effective in land management.
- And finding new ways to expand the diversity of our workforce.

This publication shows that we can all be proud of the dedicated work of our agency's employees and partners. These efforts will help the BLM meet the challenges of this decade and the next millennium.

Mike Dombeck

Preface

The showcase program was an important part of the Summit. The 30 showcase ehhibits provided all participants with greater opportunity to interact with each other. The showcase presentations were a vehicle to demonstrate the BLM commitment to excellence.

Their purpose was to allow all managers the opportunity to see what other offices are doing, share information, create a dialog between managers, focus and illustrate the Summit discussions and, lastly, record the special accomplishments of the BLM. It is important that we illustrate our work to ourselves and others. This is consistent with our themes and our institutional direction. The BLM has much to be proud of! Its management of lands and resources is unsurpassed and we can all be pleased about the work we have accomplished. Many of the thing we are proudest of took a lot of hard work and dedication to see them through to completion. The Showcase was a means of displaying our efforts.

By means of pictures and photographs, brief texts mounted on a large showcase (bulletin) boards, handouts and/or prepared displays, showcase presentations are a way for Summit participants to illustrate the themes. Additionally, many initiatives have been undertaken which demonstrate a viable BLM program of interagency and intergovernmental cooperation and resource protection and these were showcased. One of the things that is most representative of the Showcase and the Ecosystem papers, is the degree of interconnectiveness with at least several of the session themes. Nearly all of the papers focus on 3 or more of the topical sessions that were part of the Summit. Because not all of the original abstracts could be displayed, the option was given to each person who submitted an abstract to prepare a paper. Thus, an additional 20 showcases were included.

For our purposes emulation may be the highest form of flattery. The Summit *Showcase Displays and Ecosystem Case Studies* are meant to be emulated. If you find useful ideas here please, feel free to use them. One of the principles of collaboration is working together to achieve success by sharing ideas and concepts. These papers are useful for illustrating not only our commitment to excellence, but our commitment to improving the resource base and the concomitant user publics.

Some of the showcase papers are similar to the ecosystem case studies. The difference is that the showcase is the basis for a display, while the ecosystem case study revolves around a specific analysis of a problem. I have taken a few liberties with the submitted text and hope it still conveys the showcase meaning. Thanks go to Stan Bloom, BLM, Fairbanks, Alaska, who helped prepare the final text formatting and to the Nevada State Office for getting this published. Special thanks go to all the authors who prepared these showcases. Any questions can be directed to me, Richard Dworsky (907) 271-5080.

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SECTION 1
SUMMIT SHOWCASE DISPLAYS

Introduction

The Bureau of Land Management is responsible for managing close to 270 million acres of land and 570 million acres of subsurface mineral resources. Most of these lands are located in the western United States, including Alaska, and are dominated by extensive grasslands, forests, high mountains, arctic tundra, and deserts. The Bureau of Land Management manages a wide variety of resources and uses including energy and minerals, timber, forage, wild horse and burro populations, fish and wildlife habitat, wilderness areas, and archaeological and historic sites.

The Bureau of Land Management also maintains the original property and cadastral survey records of the United States. It has an interest in communities and community development which manifests itself in extensive public participation and coordination with other federal agencies; state, tribal, and local governments; and other affected interests. Lastly the Bureau of Land Management has great regard for our human resources, which represent the backbone of the agency commitment to natural resources management.

The Summit was a way to explore and to illustrate the accomplishments of the Bureau of Land Management as an organization dedicated to improving the natural and human resources for the American people. Many of these accomplishments are illustrated in this document.

Section 1 of the ***Summit Showcase Displays and Ecosystem Case Studies*** paper focuses on the technical displays presented at the Summit or proposed by abstract. In the selection of these displays, the major evaluation criteria was responsiveness to one or more of the summit themes. Nearly all of the displays had at least two and most had three or four elements of the summit themes. Because of the collective broad base of integrated Summit themes, papers are not gathered together by topics and, therefore, are presented in alphabetical order. An index in the back compiles papers by State.

The Summit themes have a direct impact on the vision that we foresee for the Bureau of Land Management. The displays and the subsequent papers illustrate coordination, cooperation, consultation, partnerships, participation, and information transfer. They also focus on other issues that influence the BLM such as effectiveness and efficiency, interest groups, decision making, integration, and workforce.

In a broad sense, these papers reflect the new, emerging mission of the Bureau of Land Management which is "to sustain the health, diversity and productivity of the public lands for the use and enjoyment of present and future generations."

The Absaroka Front In Northwestern Wyoming: A Multiple-Use Challenge

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Introduction. The southeast foothills of the Absaroka Mountains in Wyoming provide important wildlife habitat between the rugged high country of the Absaroka Mountains and the arid Bighorn River Basin. The timber stands of this area provide essential wildlife cover values and commercial harvest potential. Domestic livestock grazing has been occurring throughout the foothills over the last 100 years. Within this area are existing oil and gas fields and a high potential for more oil and gas development. Recreational use of this part of the state has shown a steady increase over the last twenty years. This variety of resource uses coupled with the mixed land ownership pattern of the area provides an environment where collaborative management is a necessity.

The upper Grass Creek drainage, in the Bureau of Land Management (BLM) Worland District, is an excellent example of this type of area and the conflicting resource values. Of the 21,823 acres in the drainage, 1,500 acres at the head of the drainage is managed by the Shoshone National Forest. Of the remaining lands approximately half are public lands managed by BLM, with the other half split evenly between privately owned land and the State of Wyoming lands. Ranging from 6,300 to 9,176 feet elevation, the drainage is characterized as a transition from sagebrush/grassland to foothills shrub/woodland to conifer forest/mountain meadow with riparian zones.

The Issues. The landscape within the Upper Grass Creek drainage is dominated by dense sagebrush and encroaching limber pine. This overstory vegetation decreases the understory component of grasses which provide forage for livestock and wildlife. When grasses are used heavily, watershed cover is reduced, fine fuels to carry a fire are gone, and the shrub component increases. Increased fire suppression within this area has also encouraged the dense shrub layer by interrupting the natural fire interval. Another vegetation change that has occurred is decreased aspen stands through conifer encroachment and decreased reproduction due to heavy use by both big game and livestock.

Although fuelwood harvest has occurred in the limber pine stands, the commercial timber harvest generally occurs in the upper reaches of the drainage. On north to east as-

pects in the mid to upper elevations of the drainage, mixed conifer stands occur with predominantly Douglas-fir as the climax species and lodgepole pine dominating earlier seral stages. Engelmann spruce and subalpine fir climax stands are limited to the upper elevations.

Throughout the area, roads have been created through timber harvest, oil and gas exploration and development, and livestock operations. Once these roads were established, recreational use perpetuated them especially during hunting season. Vehicle traffic decreased cover values for big game and increased rutting of the roads in muddy conditions.

Other issues in the Upper Grass Creek drainage include barriers to wildlife movement, cultural resources, scenic quality, and recreational opportunities. Net wire fences, originally built for sheep grazing, are barriers to wildlife movement especially during the spring when the young are not able to jump the fence. Throughout the drainage, other peoples have left remnants of their cultures which must be considered during any activity. With an ever increasing interest in hunting and other recreational uses of the area, maintaining the aesthetics and recreation opportunities is a vital consideration.

The combination of all these issues (Figure 1) and the mixed land pattern of BLM, state, and private lands has made the management of the upper Grass Creek ecosystem difficult, especially where the private landowner and the BLM did not agree on the nature and extent of the issues in the drainage. Although the BLM has the majority of the jurisdiction of the land in the area, the BLM lands are on the ridge tops while the private and State of Wyoming lands occur in the bottoms where the main access road is located. This situation required participants in the management of these lands to agree as to the issues in the landscape.

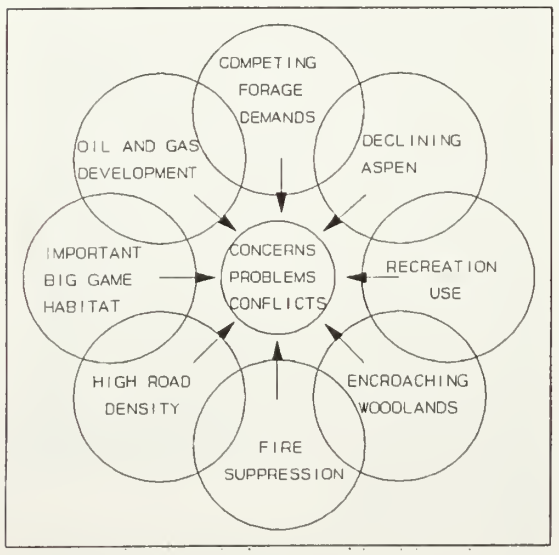

Figure 1. All of the issues in the ecosystem interact to create concerns, problems and conflicts.

All of the issues in the ecosystem interact to create concerns, problems, and conflicts. A collaborative, integrated approach to problem solving leads toward more effective management of the ecosystem.

Coordinated Approach. To address these issues and move toward a common goal, a coordinated approach to resource management is being developed and implemented (Figure 2). The BLM is seeking solutions through cooperative negotiations with a wide variety of federal, state and local government agencies, private landowners, and sportsman and conservation groups. Collaborative leadership is being promoted as the best strategy for meeting the resource demands of current and future publics. Forest, range, watershed and wildlife management along with oil and gas development, recreation use and road management are all important aspects which are being coordinated.

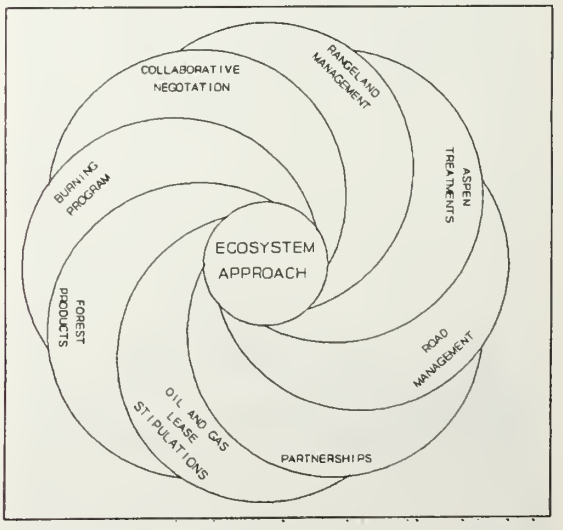

Figure 2. A collaborative , integrated approach to problem solving leads toward more effective management of the ecosystem.

Initially, the issues had to be identified and agreed upon by interested parties. The private landowner did not have the same perspective as to the necessity to address certain issues (public use of the area and livestock effects). After several years of field trips and office meetings, involved parties began to see how the other parties were viewing the resources. With increased communication, the issues became defined as discussed previously. As the process progressed, more groups were brought into the issue discussions as objectives and goals were formed.

Current participants in the collaborative efforts are:

- Bureau of Land Management
- LU Ranch
- Wyoming Game and Fish Department
- Wyoming State Land Board
- Wyoming Forestry Department
- Rocky Mountain Elk Foundation
- U.S. Forest Service
- Hot Springs County
- Local sportsman's groups
- Washakie County Museum
- Wyoming State Historic Preservation Office

Once the issues were agreed upon, the groups began to work towards solutions by identifying goals and objectives to meet those goals. Not all of these groups were involved in all issues mentioned and as other issues are addressed other groups may also be included.

The overall resource management goal is to maintain and enhance the health, productivity, and biological diversity of the upper Grass Creek ecosystem. A balance of natural resource benefits will be provided to present and future generations. Objectives toward reaching this goal are to enhance the overall cover, diversity, and vigor of the vegetation, maintain wildlife security values, and develop commodity and recreational resources.

Integrated Management Approach. These objectives and issue goals are identified in a variety of agreements and planning documents. Timber harvest plans focus on stands with an aspen component to promote dense aspen reproduction, viable timber harvest stands, and timber health protection areas. Small clearcuts of 1 to 10 acres are planned in areas for aspen enhancement and insect and disease control. Shelterwood and selection methods are used to maintain cover values in mixed stands while providing a viable timber resource. Impact mitigation measures, incorporated into all activity plans, include erosion control, maintenance of screening and cover, seasonal activity restrictions, reduction of permanent roads, maintenance of visual qualities, and protection of special or sensitive wildlife habitat features. These mitigation measures are applied drainage-wide by BLM, Wyoming Forestry Department, and LU Ranch.

Prescribed burning is designed for enhancing livestock and wildlife forage and to encourage aspen sprouting. Within this area, 3000 acres of limber pine, Utah juniper, and sagebrush are suitable for burning. In suitable areas within important mule deer and elk habitat on public land, a mosaic of 50 to 60% would be left unburned. In other areas, 20% of the area will remain unburned. Prescribed fire is also planned after timber harvest in areas that have potential for aspen regeneration. The Rocky Mountain Elk Foundation, the Wyoming Game and Fish Department, and the LU Ranch have contributed funds and people to implementation of these fires.

The objectives of the grazing management plan completed in 1993 are to improve production and cover of bunch grasses; leave 50 to 60% of the forage ungrazed in an average year to maintain watershed stability, wildlife habitat, livestock diet quality and scenic values; allow aspen sprouts to reach escape height; and allow free movement of wildlife through fences. Livestock numbers and use periods were adjusted in coordination with the burning program to enhance the health of the range ecosystem. Cooperative agreements were reached to modify the fences to provide better movement of the big game animals between their winter, spring, and summer ranges. Monitoring of the success of these actions by big game observations and trend and utilization studies on the vegetation will improve communication with the permittee, Wyoming Game and Fish Department and other contributors and allow us to make adjustments as necessary.

To address big game security and excessive erosion resulting from numerous of roads and trails in the ecosystem of a cooperative road management plan was establised. An agreement was reached between the private land

owner, conservation groups, BLM, and state agencies to determine locations and methods of implementation. This agreement indicates which roads would be closed off especially during hunting season to encourage a more primitive hunting experience and provide some security to the animals. Secondary roads are closed with gates and unnecessary roads are being reclaimed. The agreement provides for public foot and horse access on all ownership and allows commercial traffic with constraints.

The impacts of oil and gas production and exploration activities are lessened by seasonal restrictions on construction and drilling to protect big game winter range and parturition habitat. Stipulations are applied to one-third of the drainage to protect combined crucial winter, migratory and parturition habitats throughout the production phase. Efforts are being made to minimize noise and activity in operating oil and gas fields which may affect wildlife use of the area and the recreation potential. Other standard stipulations protect the ecosystem by restricting activity on steep slopes and riparian areas.

Recent acquisition of the main road in the bottom of the drainage, to supply access to the National Forest, has led to a cooperative maintenance agreement between the Shoshone National Forest, BLM, and Hot Springs County. Discovery of a conical timber lodge within the drainage involved several volunteers, the LU Ranch, the local museum and a state agency to remove the lodge before it rotted into a pile of logs. This lodge has since been reconstructed for the public to view in the museum.

With these management initiatives and restrictions, multiple use of the public and private resources occurs while the resource goals are being met. Initial indications are that the big game populations are responding favorably to the management. An enhanced aspen component in this ecosystem will add to the existing values of the area for wildlife, livestock, recreation and wood products. Most public recreationists have responded favorably to the road management initiative. Of greatest significance is the continually developing cooperative approach to managing the ecosystem. This approach is expanding to other drainages along the Absaroka front and should compliment an overall collaborative effort to manage the entire greater Yellowstone ecosystem.

An Award Winning Ecosystem Management Tool

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Resource interpretation can be a potent ecosystem management tool for BLM. As BLM employees we learn the details of our local ecosystems daily as we make our rounds. Our education, observations, and simply "being there" helps us connect with the lands we manage. For casual visitors the subtleties of our ecosystems can be impenetrable mysteries. Resource interpretation connects the visitor to our resources, initiating them into our ecosystems by drawing their attention to the details and relationships that we have found to be important. Interpretation gives people a new pair of goggles through which to view our resources. Interpretation is an ecosystem access tool, that can open up the public lands for public appreciation.

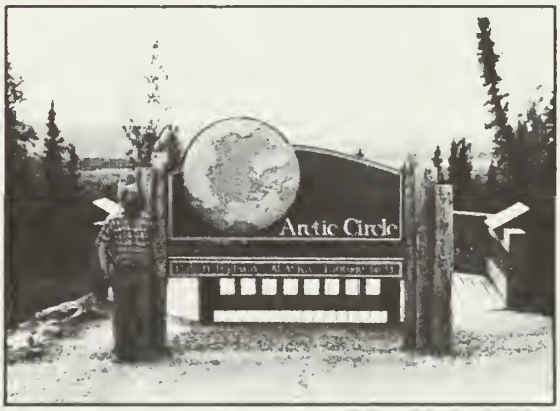

Figure 1. Happy pictures like this are being seen around the world.

Interpretation is a special form of translation. Interpretation converts the technical information of natural and cultural resources of our lands into the language of the visitor. The translated information should provoke the visitor's interest, so they can understand both the agency's role and resources better. Visitors can cross miles of BLM property without understanding what they are seeing, what happened there earlier or what is happening there now.

By focusing the visitors' attention on the resources that are important, the interpreter leads the visitor to a unique connection with a site or resource. Like a magician explaining a trick, they make the hidden obvious. This new awareness can be delivered through any interpretive medium: Brochure, wayside exhibit, audio cassette, film, talk or visitor center, but in the end the visitor is connected to the resource in a new way. When that con-

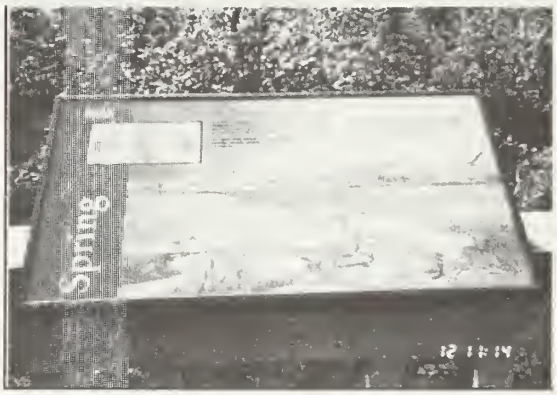

Figure 2. This illustration draws attention to the explosion of productivity that returning light brings to the Arctic.

nection with the resource occurs the connecting agency also gains status in the eye of the visitor. In Alaska a wayside exhibit developed through a team effort has helped connect visitors with our resources and brought new respect and appreciation to Bureau of Land Management. It may serve as encouragement for more endeavors in resource interpretation so we can better connect our clients with the ecosystems we manage.

Arctic Circle—Bringing It Down To Earth
A Case Study

Wayside exhibits work best when they connect the reader to something in the immediate area, but here was an exhibit site whose subject was out of this world. One of the significant points on the Dalton Highway in northern Alaska is crossing the Arctic Circle. Making that abstraction of astronomy and geography, the Arctic Circle real, understandable and memorable for our visitors was the challenge. Typically a wayside exhibit brings an event at a particular location, a structure, or an object into focus for the person reading the exhibit. This time it would be a little bit different.

Working with a team of interpreters, a wildlife biologist, outdoor recreation planners, a landscape architect and an engineer we wrestled with what theme would drive the exhibit. The ad hoc team performed well. We knew that the Arctic Circle needed to be a special experience for visitors venturing that far north. What did we want people to learn at the site?

We had some false starts both architecturally and with our message. But as so often happens in the creative process with teams, the sum was greater than the individual contributions. We refined our ideas. Good interpretation takes time. What was the Arctic Circle and the Arctic really about? In retrospect a simple question, but it required serious thought to winnow out all the possibilities. The answer to that question was, "light." All year

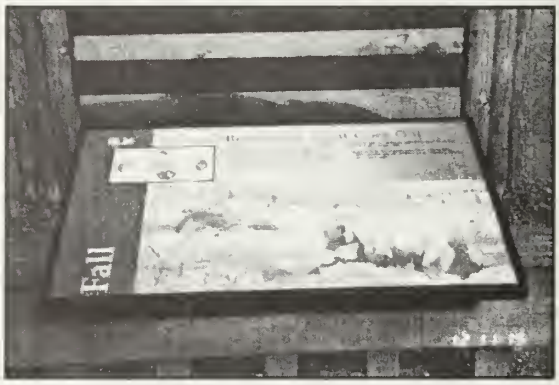

Figure 4. Autumn happens quickly in the Arctic giving the tundra a burst of color

Figure 3. Flowers and plants are the focus for this panel which focuses on the Arctic's intense growing season.

Figure 5. Even small dramas played out beneath the snow in dead winter add to the understanding of the Arctic.

long light drives what happens in the Arctic. In the endless days of summer or the cold winter darkness, it is light that sets that region apart, making it unique.

Our visitors see the Arctic only in the summer, so we wanted to show them what they couldn't see, the rest of the year. We also wanted to make their stop at the Arctic Circle memorable. Four wayside exhibit panels discussing what light was doing season by season, and how the Arctic ecosystem responds helps the visitor see the Arctic as a whole. A simple deck was designed to hold the exhibit panels and to focus visitor attention, and a "trophy sign". The attractive sign featured a carved circumpolar globe with the Arctic Circle imposed on it. Even before we had officially opened the facility, visitors were being videotaped and photographed next to the sign with its BLM logo taking a trophy of their crossing into the Arctic home with them. Now those photos, slides and videotapes are being shown around the world.

While developing the text for the exhibit panels the team worked hard to reward the readers. The exhibit text was carefully honed

Figure 6. Taking pictures is a popular pastime in the arctic.

to make the language engaging, active and vivid. We put the most important information first to make it easy to understand. We made the information as simple as possible. Each panel averaged only 100 words, less than a sheet of double spaced typing paper, but we packed as much information into those words as we could. We wrote about seasonal change, sunlight, darkness and animal and plant adaptations to those changes.

We could have legitimately written several different things at the Arctic Circle site, any-

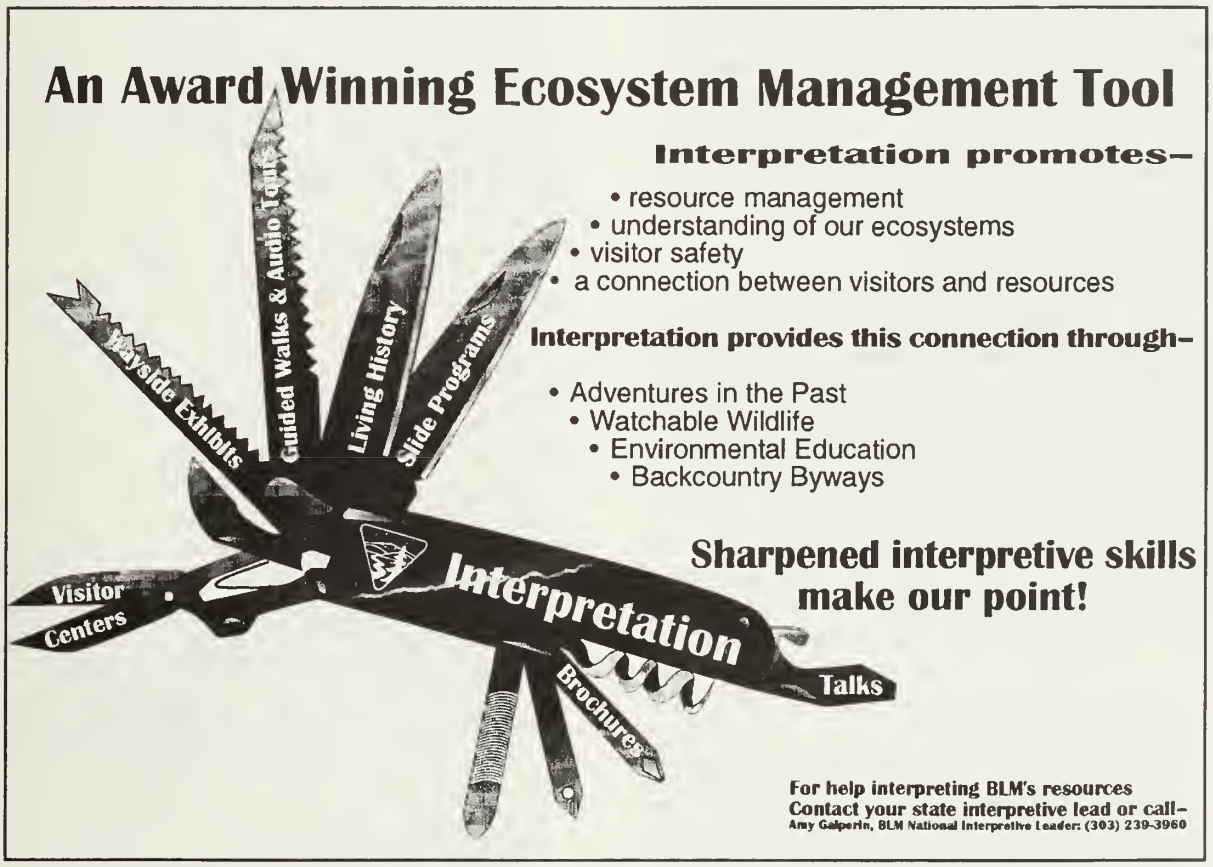

Figure 7. Swiss Army Knife/Ecosystem Management Tool.

thing from Arctic dinosaurs to Alaska Native cultures, instead we focused on what was uniquely important at the Arctic Circle site light and the way it shapes climate and life in the Arctic. The illustrations for the panels were similarly focused and tried to compliment and visually restate the main points of the text. There were no visual elements in the panels that did not pertain directly to "light" or its impacts.

Were we successful in our bid to connect our visitors with the Arctic Circle? The National Association for Interpretation recognized our work with a national first place in Wayside Exhibits. But the real rewards were on the ground, follow-up surveys indicate the exhibits communicate clearly. 90% of the respondents used the exact concepts spontaneously in answering the survey questionnaire, the precise information we had worked to communicate. The fact that day tours are driving 300 miles on gravel roads from Fairbanks, during the summer, to take advantage of the exhibit is another indication of its success and impact. But the best gauge of our success came from a woman from the mid-West who wrote for a copy of the text from one of the panels. A picture she had taken of a panel hadn't turned out and she wanted to share the information with her friends back home. Good interpretation has ripple effects in its retelling, that we can scarcely know. Now in slide shows, photo albums shared between friends and private video travelogues across the country and around the world, the BLM logo is seen in conjunction with excellence.

Team members making contributions toward the success of the Arctic Circle Wayside include: Jan Burris, Marin Kuizenga, Jeff Shryer, Roger Evans, Gene Ervine, Sue Steinacher, Kent Biddulph, Jim Sisk, Roger Delaney and General Graphics Inc.

Automated Personal Property Reutilization System Improving the Way BLM Does Business

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Development History The BLM Service Center Property Management Staff has developed a mechanism to speed up the lengthy excess personal property reporting process prescribed by GSA regulations, and reduce clerical time involved in reporting. Working within GSA-provided guidelines, the Service Center developed an automated program within the BLM Automated Personal Property System (APPS) which took property data and created a data file in the specified GSA automated format for electronic reporting in lieu of manual typing of SF120 Reports of Excess Personal Property.

The BLM transmitted the first excess personal property report containing BLM excess and exchange-sale property to the General Services Administration via magnetic tape in March 1987. This automated reporting eliminated many BLM workhours spent typing SF120 and SF126 Reports of Excess Personal Property. This was the beginning of a major automation effort by the BLM to automate not only excess/exchange-sale reporting but also reporting of available property to Bureaus within the Department. Prior to automation, approximately 600 BLM available and exchange sale line items were manually typed, circulated to other DOI Bureaus and Offices (125 addresses), and ultimately mailed to the appropriate GSA regional office. In FY93, 2,229 available and exchange sale line items were circulated to over 550 addresses for DOI screening utilizing the same BLM FTE as in FY90.

In October 1989, the U.S. Geological Survey, Central Region, requested BLM's permission to utilize the BLM automated personal property reutilization system for DOI screening and automated reporting to GSA. This project was accepted by the BLM as a test to be evaluated at the end of the fiscal year. The outcome mirrored the BLM's results - an increase in number of items reported and a decrease in clerical time to accomplish this task. The USGS's Headquarters then requested to utilize the system nationwide.

In FY 91, the Department of the Interior established a pilot program opening the BLM system to all DOI Bureaus and Offices as a Department-wide reutilization and disposal system. This system was an important part of DOI's effort to streamline and improve the effectiveness of administrative systems De-

partment-wide. As of the end of FY 93, the U.S. Geological Survey, Bureau of Reclamation, Bureau of Mines, Office of Surface Mining and Bureau of Land Management nationwide are utilizing the system. The Minerals Management Service and Fish and Wildlife Service are expected to have programming completed in this fiscal year, which will enable them to use the system. A total of 10,256 line items of Department available property were reported through the Automated Personal Property Reutilization System in FY 93, and 10,428 line items of Department excess and exchange-sale were transmitted to GSA.

One of the most significant enhancements with this system is the on-line automated reporting to the General Services Administration FSS23 system. The BLM was the first agency to transmit excess and exchange-sale reports from computer to computer, accomplishing in 15 minutes what previous took 5 to 10 work days from beginning to end.

The biggest accomplishment, however, is the creation and operation of the electronic bulletin board system. This system contains current data on available personal property reported through the DOI Available Personal Property Reutilization System. An On-line Available Property Report is currently available through the BLM mainframe computer, but access to the BLM computer is limited to authorized users. The bulletin board has made DOI available property screening accessible to any office equipped with a personal computer, a modem and communication package (which is standard equipment for most offices).

Accomplishments (Outcomes)- Although the initial motivation to create an automated system was to eliminate manual reporting procedures, a greater achievement was realized by consolidating Bureaus' available property. The circulation of Available Catalogs and increased awareness of the bulletin board system provided greater advertisement, thus more and more available property is being reutilized within the Department than ever before. The BLM acquired $34,430 of available personal property in FY 90 through other DOI Bureaus and Offices. In FY 91, after the USGS began utilizing the automated system, available property acquired by the BLM from within the Department increased by 33% In FY 93, the reutilization of Departmental available personal property by the BLM was $361,529. Other DOI Bureau and Office system users are reporting (through the SF121 end-of-year reports) similar increases. Additionally, savings in warehousing costs are being realized by faster movement of property to requesting Bureaus. In this time of tight budgets and reduced resources, circulation of available property is an important tool to acquire needed equipment.

This project effectively illustrates an NPR objective to improve the way we do business by:

- significantly increasing processing efficiently, which reduces time required to move available property and reduces workhours devoted to processing it.

- significantly increased reutilization of Government property, which avoids purchasing expense or provides equipment which agencies could not otherwise afford. BLM went from acquiring $34,430 of available personal property from other DOI Bureaus to acquiring $361,529 from other DOI Bureaus and Offices through this system in FY 93. This is an increase of over 1,000% in three years.

- a project which started out as a BLM initiative has been expanded to provide benefits to the entire DOI and provide a model for other agencies.

Automated Tracking of Alaska Native Land Transfers

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FAX (907) 271-4223

Serving a Diverse Public- The Native people of Alaska are among our most important customers. In addition to implementing the huge land transfer mandated by ANCSA, we are also responsible for adjudicating thousands of individual Native Allotments. Under the Native Allotment Act, individual Natives were eligible to file for land parcels of up to 160 acres based on use and occupancy. Besides providing direct services to Native people through adjudicating, surveying and transferring ANCSA lands and Native Allotment parcels, Natives make up a large percentage of the population in the areas where BLM-managed lands are located. Natives (through their corporations) also own most of the private land near BLM-managed lands. The Native people of Alaska are the largest private landowners in the world. Effective management of BLM lands will require cooperation with Native corporations. Natives are an important part of the diverse public we serve.

BLM and ANCSA: A Historical Perspective- The Alaska Native Claims Settlement Act of 1971 was enacted in response to the need for a fair and just settlement of aboriginal land claims in Alaska. As compensation for extinguished claims of aboriginal title based on use and occupancy, Alaska Natives would receive 44 million acres of land and close to one billion dollars. The Act directed Natives to form regional and village corporations to be used as vehicles for distributing the land and money. Shortly after the passage of ANCSA, the Department of the Interior developed regulations for implementing ANCSA. The regulations established the procedures for filing the original land selections within the statutory time frames.

BLM in Alaska expanded dramatically to meet the demands of implementing ANCSA. In 1970, there were 10 employees working in all of adjudication. By the early 1980's there were 130 people working in the ANCSA Division alone. ANCSA also created an immediate need for a computer system to keep track of the Native selections. By 1975 the Bureau's first automated land records system was installed in Alaska.

Where are we today? Over 80 percent of ANCSA lands have been conveyed to the Native corporations. The vast majority of the conveyances have been interim conveyances because the lands are not yet surveyed. Survey-

ing and conveying the land is an enormous undertaking. Forty four million acres is the size of Washington state or twice the size of Austria. It is estimated that over 80 thousand miles will be surveyed in order to implement ANCSA. Eighty thousand miles is nearly halfway to the moon. It is more than three times around the earth. To accomplish this daunting task BLM in Alaska has embraced several generations of technological advancement in automation, telecommunications and surveying.

ANCSA Acreage Control. The new computer system is an accounting system that works with land instead of money. The ANCSA Acreage Control system supports our fundamental business requirement to convey the land the Natives of Alaska are entitled to under ANCSA. We must convey the number of acres they are entitled to. Each of the more than 300 land entitlements owned by the Native villages and regions is treated as a separate account. The patents which convey land to the Native corporations are recorded as charges against a specific land entitlement. The charges are the basic transactions of the system. The old system provided running totals and did not store the individual charges (transactions). On a detailed level the ANCSA Acreage Control provides a report that resembles a bank statement of a checking account. The report is a detailed history of a land entitlement and all of the conveyances which satisfy it. The transaction-based system also provides statewide summary reports which track the progress of conveying ANCSA lands. It provides information to support the management of the conveyance process.

Axial Basin CRMP A Big Step in the Right Direction

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Setting And Scope- Axial Basin is located in Moffat County approximately 25 miles southwest of Craig, Colorado. The Basin and its adjoining watershed covers approximately 105,000 acres that drain north into the Yampa River. Land ownership is approximately 53% private land, 7% state land and 40% BLM. Annual precipitation averages 12-14 inches per year with half or more coming in the form of snow. Temperatures range from -50°F to 100°F. The CRMP was developed on two allotments covering approximately 29,000 acres.

Vegetation in the Basin is dominated by a sagebrush-grass plant community with scattered islands of salt desert shrub communities. Some stands of sagebrush are decadent and are causing depression of herbaceous plant production and diminishing watershed stability. An estimated 800-1,000 acres of the allotments were reseeded to crested wheatgrass 40-50 years ago. Big sagebrush encroachment on these areas has been significant. Riparian areas are found along Morgan and Lower Boxelder gulches. Both drainages contain perennial waters in normal precipitation years. Vegetation along these two drainages is dominated by an overstory of Basin big sagebrush and some greasewood with a sparse grass understory. Heavy infestations of whitetop or hoary cress (Cardaria SPP), an introduced weed, are found along drainages and scattered throughout the upland range sites.

Current Management Situation- The allotments are grazed by cattle and sheep from December until July each year. Sheep use primarily occurs from December until the end of March when they move out of the allotments. Cattle grazing starts the first of May and continues until the first part of July. The cows are turned back into the allotment in October and November, if forage is available for approximately one month. Because of drought conditions in the area from 1987 to 1992 the permittees voluntarily reduced the number of sheep and cattle grazing on the two allotments by approximately 50 percent.

A small resident deer herd stays in the Basin year round. Deer migrate from the surrounding highlands into the Basin starting in late November to mid-December. Winter populations will reach four or five thousand head in Lower Boxelder Allotment before the deer start moving out of the area into the high-

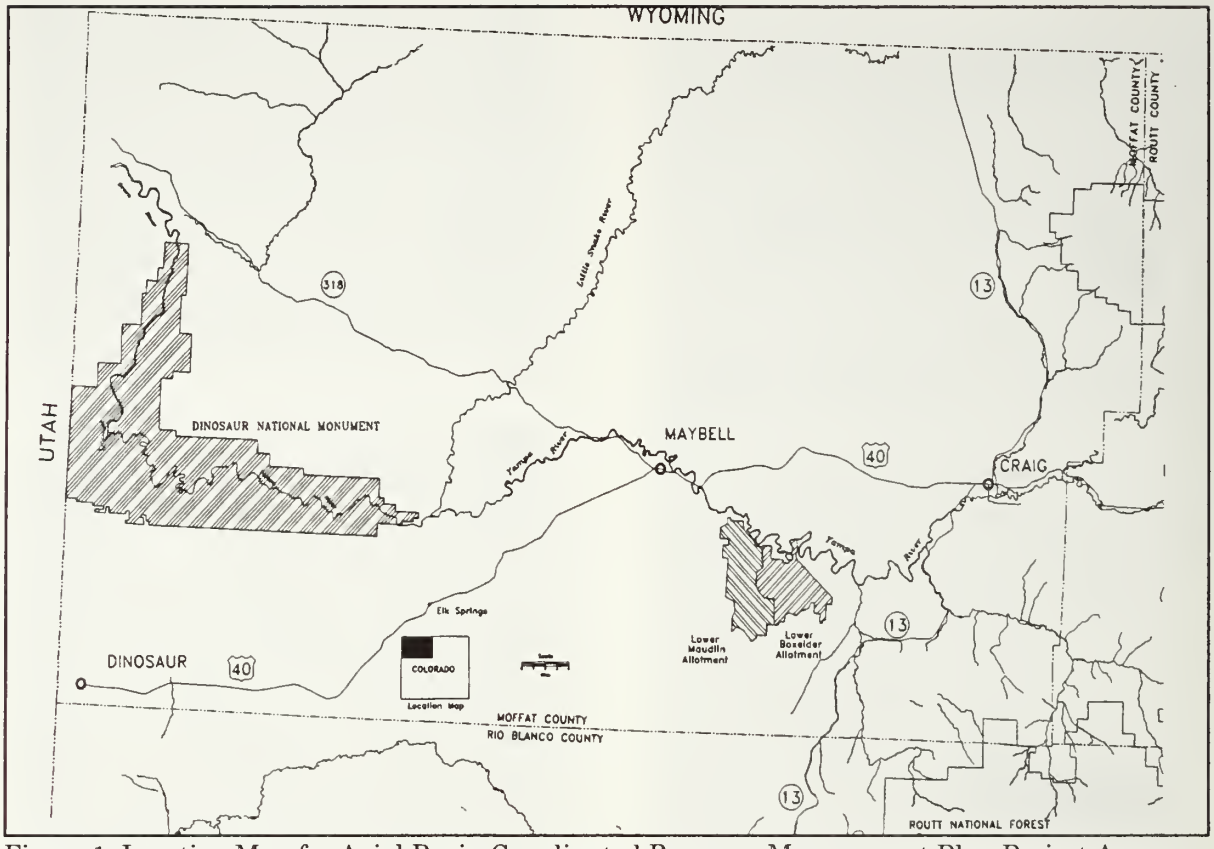

Figure 1. Location Map for Axial Basin Coordinated Resource Management Plan Project Area

lands. Elk migration into the area is similar to the deer except that they do not concentrate in the north end of the Basin unless deep snows force them to that area.

Participants And Brief History- A Coordinated Resource Management Technical Review Team was organized to develop the CRMP and was the primary source of technical input. This team consisted of the permittees, Soil Conservation Service (SCS), Colorado State University (CSU) County Extension Director, Colorado Division of Wildlife (CDOW), CSU State Extension Range Specialist, Bureau of Land Management (BLM), Craig BLM District Grazing Advisory Board, and Axial Basin Ranch Co. (ABR) owned by Colowyo Coal Company.

The Axial Basin plan took approximately two years to complete (dated October 1992). Initially, the participants spent time becoming comfortable with those who might have a different view than their own and developing a mutual respect and trust of each other. Because of their commitment to the resources and the CRM process, the Technical Review Team was able to develop and begin implementing a plan for all the major resources and land ownerships within the two allotments. The plan was approved by consensus (unanimous agreement) of all parties.

Objectives And Present Status- Since the CRMP was completed, a significant number of management actions have been implemented in an effort to meet the objectives of improving the overall vegetation condition of the Lower Boxelder and Lower Maudlin allotments and to meet the livestock and wildlife forage demands by: 1) Improving the vigor and overall health and diversity of the browse species in the Basin, including Wyoming big sage, by reducing defoliation levels; 2) Improving the vigor, density and overall health of the perennial grasses and forbs in the Basin by providing periodic rest during the critical growth periods; 3) Improving the condition of riparian areas along Morgan and Boxelder gulches; 4) Controlling the spread of whitetop and other noxious weeds in the Basin; and 5) Effectively managing to achieve the desired plant community (DPC) for the major and important range ecological sites in the Basin.

A six-year Rotation Deferred Grazing System was initiated in 1992. The first two years the pastures at the north end of each allot-

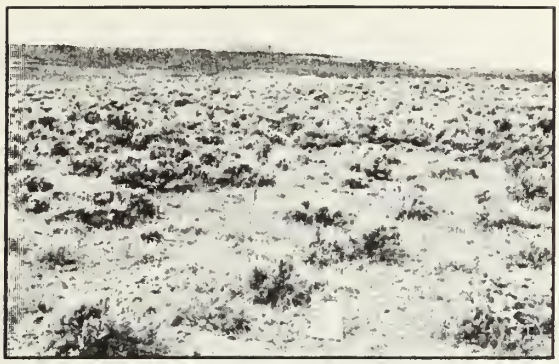

Photo 1. Shurbs and grasses have benifited from the Rotation Deferred Grazing System.

ment were deferred alternately from winter sheep and spring/early summer cattle use. These areas are considered severe winter deer range. From 1994 through 1997 each of the four pastures is deferred once during the growing season and once from winter sheep use. The pasture deferred with cattle during the growing season is the first pasture grazed by sheep in the winter that year. The Rotation Deferred Grazing System has provided some very positive results in a short time, including improvement of plant vigor. On the semi-annual trip to assess utilization after 1993 spring use by cattle it was hard to tell the difference between the deferred pasture and the pastures used first and second by cattle.

In order to set up a four pasture Rotation Deferred Grazing System on the two allotments, five miles of new fence was constructed. The three-strand fence was built so as to minimize restriction of wildlife movement. Maximum height of the top wire is 38 inches to allow for movement of deer and elk. The bottom wire is smooth wire and 16 inches off the ground to allow for movement of an-

Photo 2. Five miles of new fence was constructed in order to set up a four pasture Rotation Deferred Grazing System.

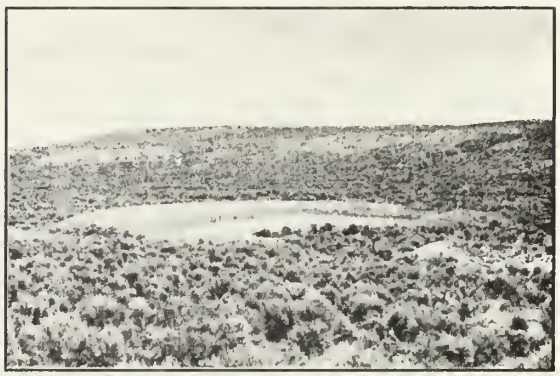

Photo 3. Thirtyreservoirs were constructed to improve distribution of livestock and wildlife.

telope. Additionally 30 reservoirs have been constructed to improve distribution of livestock and wildlife and take pressure off the ness of the weed problem, primarily whitetop, has been underestimated. Although there have been several years of weed control efforts along county roads, on private lands, etc., we were rapidly loosing the battle. A special meeting of the Axial Basin Technical Review Team was called with weed specialists from Colorado State University and the Moffat County Pest and Weed Management District present. The need for an accelerated weed control program and the benefits of weed control/reseeding test plots was discussed. It was decided that the most beneficial efforts would be weed control from the top of the drainages down, continue spraying along roads, around reservoirs and small patches. The permittees, Axial Basin Ranch Co., Moffat County, Colorado First Soil Conservation District and the Bureau of Land Management committed a combined total of $21,700 for weed control, test plots and continued mapping of weed infestation in Axial Basin for 1994 under the direction of the Moffat County Pest and Weed Management personnel. A coordinated weed control effort will continue in future years to gain control of the infestation and restore productivity of the land.

Relationship To Summit Themes: The Axial Basin Technical Review Team brought together federal and state agencies, land users and landowners, and Colorado State University representatives in a collaborative effort. This effort is now serving as a model in this region for other conflict areas. The effort will help restore and maintain a healthy ecosystem by: 1) Improving the overall range condition of the area, including riparian areas and uplands; 2) Accelerate weed management for

whitetop and all noxious weeds; and 3) In the event of a severe winter, implement "contingency plan" to remove sheep from areas classified as critical deer winter range, etc.

This effort has improved the way we do business by clearing the way to resolve long standing conflicts and expedite implementation measures.

Book Cliffs Conservation Initiative

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The Book Cliffs Conservation Initiative is a rare opportunity to take a more balanced ecosystem approach to manage the area's unique natural resources. The proposal has been cooperatively developed by the Utah Division of Wildlife Resources (UDWR); the Bureau of Land Management (BLM), U.S. Department of the Interior; the Nature Conservancy (TNC); and the Rocky Mountain Elk Foundation (RMEF). Several other organizations and individuals are also supporting the project. The crux of the Initiative is the acquisition of key tracts of private land in order to provide new management options. Without these properties, the present management strategies will continue without significant changes.

Area Description- The Book Cliffs area is a part of the East Tavaputs Plateau that begins near Green River, Utah and extends eastward into Colorado. The area covered by the Initiative begins about 50 air miles south of Vernal, Utah and extends south to the watershed divide. The eastern border is the Colorado State line and the western boundary is the Uintah and Ouray Indian Reservation. (See attached map).

This unique area contains widely diverse ecosystems and maintains a "frontier mystique". The area begins in the northern desert shrub zone at about 5,500 feet and rises southward to about 8,500 feet in the aspen and fir zones. The area between consists of broad sagebrush and pinyon/juniper vistas broken by deep valleys, many containing perennial streams. The portion of the Book Cliffs covered by the Initiative encompasses approximately 450,500 acres.

The ranches targeted for acquisition are mostly in the canyon bottoms and include most of the streams and sensitive riparian areas. Currently, the area is grazed by approximately 3,200 head of cattle belonging to the ranches that have not been acquired. Livestock grazing on the Federal and State lands is managed according to allotment management plans. The uplands are in a generally satisfactory condition. However, much of the canyon bottoms and their riparian zones have been severely degraded. These bottoms are primarily used for livestock grazing and raising hay. They include about 50 miles of streams, one of which currently has a brook trout fishery. These bottom lands are also heavily utilized by wildlife such as waterfowl,

Ranch Properties Pertinent to the Book Cliffs Conservation Initiative

Ranch	Private Acreage	Federal AUMs	Federal Acreage	State Acreage	Total Acreage
Cripple Cowboy	6,042	6,310	88,938	19,919	114,899
S & H Ranches*	5,660	11,053	136,824	21,566	164,050
DeLambert	1,954	2,280	39,078	26,499	67,531
H. E. Graham	3,720	4,420	53,998	46,399	104,117
Total	17,376	23,863	318,838	114,383	450,597

* S & H Ranches owns 1,450 acres outside the Book Cliffs Initiative

deer, elk, black bear, lions, raptors, and small mammals.

Need For The Initiative- The Book Cliffs Conservation Initiative came about when ranchers expressed an interest in selling their properties. This presented a rare opportunity for cooperators in the Initiative to acquire these valuable bottomlands.

Private developers have expressed interest in these ranches for summer home development. If this occurs, it will greatly restrict the public's opportunities to access private lands traditionally available to them. Public lands, where access is through private lands, could also be blocked.

Private land owners have concerns about the impact of wildlife depredation on their privately owned lands. The perceived competition between wildlife and livestock for forage on public lands has also caused conflicts between sportsman and ranchers. Currently approximately 2,000 elk and 17,000 mule deer inhabit the area within the Initiative and will continue to increase with the acquisition of the ranches.

Objectives-

1. Acquire key privately-owned lands in the area covered by the Initiative to protect critical habitat for all wildlife, enhance watersheds and associated riparian areas, and assure public access and recreational opportunities for future generations.

2. Establish the Book Cliffs, within the Vernal District of the BLM, as a multiple use showcase area. The intent is to demonstrate a management commitment to the area's unique ecological values.

3. Emphasize cooperative management that would focus on increased wildlife density and diversity, riparian habitat, enhanced water quality, fisheries expansion, and recreational opportunities. Other uses such as livestock grazing, tar sands, oil shale, "Gilsonite", and oil and gas exploration and/or production would continue in an environmentally sensitive manner.

4. Develop, with the assistance of all interested parties, a Coordinated Resource Management Plan to define the specific management objectives and methods of implementation.

Accomplishments- The Initiative has moved with surprising speed and support. TNC and the UDWR have secured the Graham Ranch for wildlife. The RMEF purchased the Cripple Cowboy Ranch and subsequently disposed of the private lands to the BLM and UDWR. UDWR and the RMEF have retired 50% of the grazing preference which is now being allocated for use by wildlife. The S&H Ranch owners have expressed an interest in the BLM acquiring at least a portion of the ranch through exchange. The DeLamberts, the owners of the fourth ranch, are cooperating with the BLM and UDWR to change their livestock grazing practices to improve range conditions.

The Cunningham Ranch, located within the Book Cliffs Roadless Area, was recently pur-

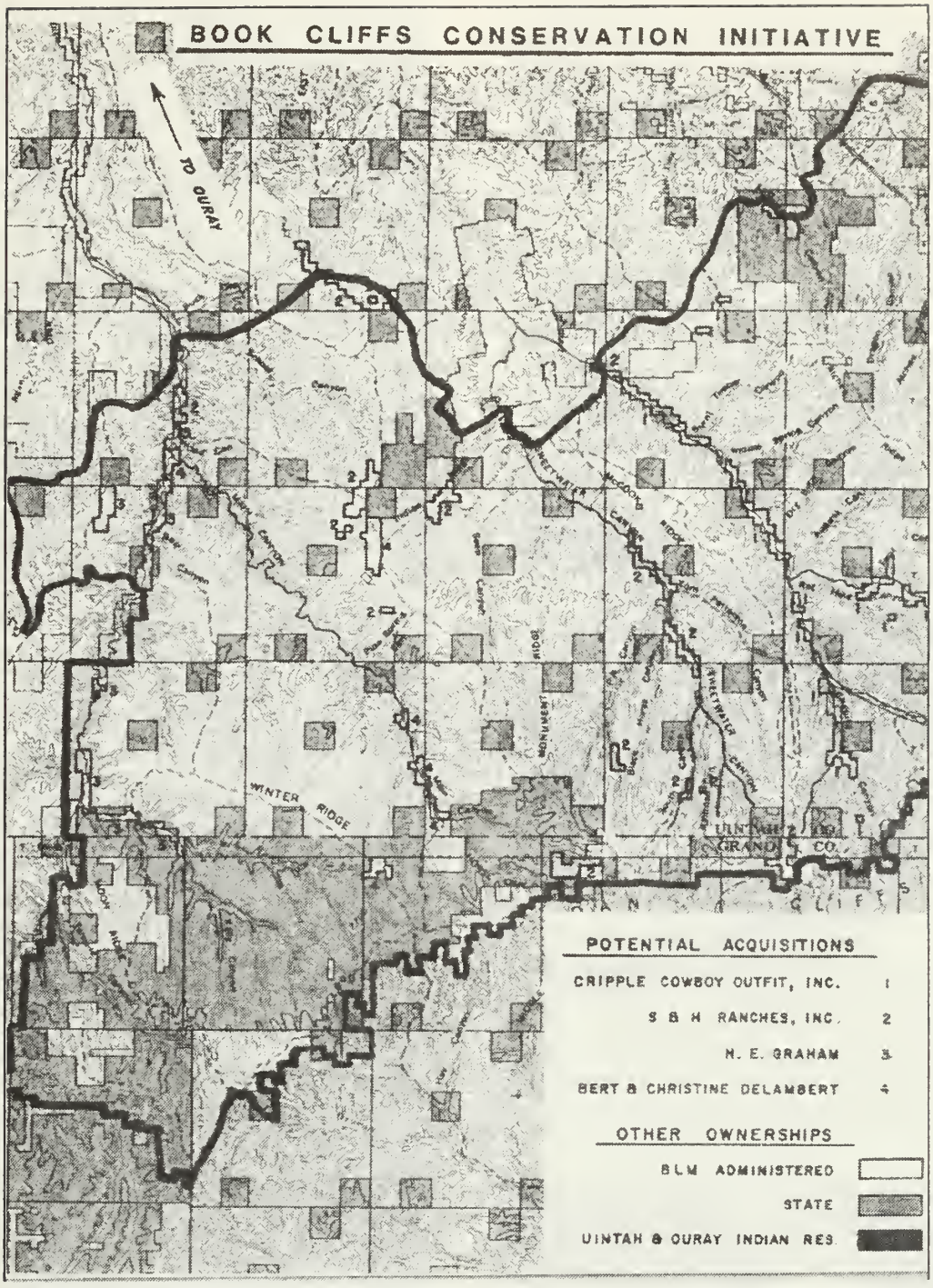

Figure 1. Book Cliffs location map.

chased through a cooperative effort by TNC and UDWR with a contribution from RMEF. The roadless area is not included within the area covered by the Initiative, but the acquisition complements the objectives of the Initiative. This property is immediately south of the Graham Ranch and includes the headwaters of Willow Creek. The ranch includes 7,600 acres of private land along with a Federal grazing permit and state land leases.

Rangeland improvement project work has begun on the acquired ranches. Unproductive areas are being treated and seeded with browse and grass. Willows and other shrubs have been planted in the riparian areas. Fences have been built to exclude livestock from approximately 25 miles of riparian areas. Rangeland studies have been established to monitor changes in vegetation, water quality, aquatics, fisheries, wildlife densities, bilogical diversityand watershed condition.

BLM Oregon/ Washington Cooperative Education: An Effective Tool In Diversifying Our Work Force

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Studies such as *Civil Service 2000* and *Workforce 2000* demonstrate a need to develop effective recruitment strategies to attract and retain a workforce that is culturally and gender diverse. Strategic planning documents such as *Fish and Wildlife 2000, Recreation 2000, Range reform 94* , etc., demonstrate that BLM is in a state of transition and that a comprehensive recruitment strategy is needed to meet our objectives. In addition, BLM Oregon/ Washington's demographic workforce information suggests a large number of employees are eligible to retire in the next 5-10 years and we will be facing a significant challenge to replace these personnel in a variety of resource fields.

Patrick Merril, Range Technician–Treasure Valley Community College

In response to these issues, BLM Oregon/ Washington has established a coordinated, effective recruitment program which emphasizes strategies to recruit and retain a workforce that is reflective of American society. Our recruitment program utilizes teams

Effie Frazier, Fishery Biologist–University of Arkansas ai Pine Bluff

comprised of managers, supervisors and former co-op students to recruit at Historically Black Colleges and Universitys (HBCU), Hispanic Association of Colleges and Universitys (HACU), Native American and other institutions. Outreach activities have included career fairs, special emphasis conferences, meetings and interviews with students and faculty, and contacts with minority and women student organizations. The program has been provided off-the-top funding by the state management

Files Sanders, Fishery Biology Student–University of Arkansas at Pine Bluff

team to support recruitment program objectives and activities ($115,000 for FY-94). The mainstay of our recruitment effort has been the Cooperative Education Program.

Cooperative education is a "win-win-win" program; all participants, the student, the

Yen Truong, Staff Assistant–Portland Community College

school, and the Bureau, benefit. Specific benefits for each of the participating parties include:

<u>For the Student</u>:

- Applies classroom theory to "real world" work experiences
- Serves as a method to explore options before choosing a career
- Training and tuition assistance
- Payment for travel expenses to and from duty station and school for all work

Elijah Waters, Fishery Biologist–North Carolina State University,

experience periods

- Travel *and* transportation expenses paid at the time of initial appointment or at the time of conversion to a career-conditional appointment
- Students may receive a salary advance of up to two pay periods upon initial appointment

For the School:

- Provides well-rounded education and curricula enrichment
- Increases student enrollment and encourages retention
- Expands teaching resources and faculty knowledge of workforce needs
- Assists in placement service activities
- Enhances relations with the Federal government

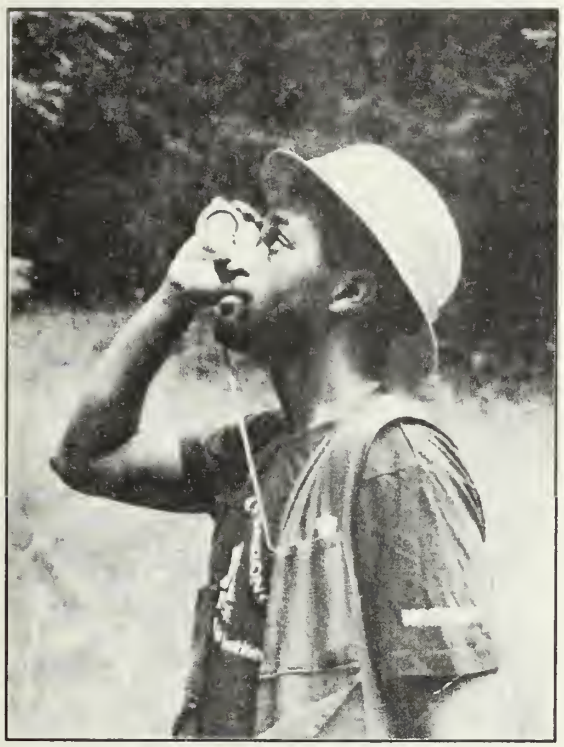
For the Bureau:

- Superior students hired as work performance is observed/evaluated
- Flexibility built in to recruit, select, and

convert students from a broad spectrum, in any career field, at all levels of study
- Attracts talented minority, women, and disabled candidates

Raul Morales, Wildlife Biologist–New Mexico State University

- Generates high retention—students in the program more likely to commit to and remain in permanent positions
- Builds sound ties between BLM and the educational community
- Brings new perspectives as students integrate new techniques learned in the classroom with what they find on the job



Norvery Tate, Forester– Alabama A&M University

In selecting schools for recruitment of cooperative education positions, we have felt it important to maintain a balance in our recruitment sources. We recruit in Oregon and Washington and have built a solid, long term relationship with schools in this region. However, we have felt it important to recruit nationally at a variety of schools in order to assure recruitment among ethnic minorities as well as to provide diversity in professional background. Our recruitment efforts have demonstrated the cooperative education program to be an effective strategy in meeting AEP and FEORP objectives and in filling positions in emerging natural resource occupations. Since FY-91, 55 students have been converted to career-conditional appointments through this program and 76% of all conversions were either women and/or ethnic minorities. The following charts document the results-oriented nature of this program and identify the student's school and the specific occupations to which they have been converted since FY-91. Selected photographs of individuals who have participated in this program may be found at the back of this paper.

COOPERATIVE EDUCATION PROGRAM
CONVERSIONS TO CAREER-CONDITIONAL APPOINTMENTS

FY 91-94

Total	55
Male	18*
Female	37
Minority	11
Percent Minority	20%
Percent Women	67%

*Five of the eighteen male conversions were ethnic minorities

EDUCATIONAL INSTITUTIONS

Alabama A&M University
Boise State University
California State University at Chic
Central Oregon Community College
Clemson University
Humboldt State University
New Mexico State University

North Carolina State University
Oregon Institute of Technology
Oregon State Univeristy
Portland Community College
Southern Oregon State College
Southwestern Oregon Comm. College
State University of New York College
of Environmental Science and Forestry
Texas A&M University
Texas A&M University - Kingsville
Treasure Valley Community College
University of Arizona
University of Idaho
University of Montana
University of Nevada-Reno
University of Oregon
University of Washington
University of Arkansas at Pine Bluff
Virginia Polytechnic Institute
Washington State University

OCCUPATIONAL SERIES

Botanist
Forester
Outdoor Recreation Planner
Cartographer
Forestry Technician
Program Analyst
Civil Engineer
Hydrologist
Range Conservationist
Computer Systems Analyst
Interpretive Specialist
Range Technician
Contract Specialist
Land Surveyor
Staff Assistant
Fishery Biologist
Natural Resource Spec.
Wildlife Biologist

In Oregon/Washington as we move toward ecosystem management it is clear that our needed occupational skill mix will change. It is also clear that we have a responsibility to employ a workforce that is gender and racially/ethnically diverse and reflective of American society in general. Thus, it is important that we maintain a viable recruitment program so that we can fill positions with the "best and brightest" students available in these new emerging natural resource occupations and disciplines. Cooperative education has proved to be an effective tool in meeting this objective and in meeting affirmative employment initiatives.

BLM in the East - 31 States of Innovation

Pete Culp,
State Director;
Terry Lewis,
Chief, External Affairs;
Don Cabrera,
Audiovisual Production Specialist;
Cathy Applegate,
Public Affairs Specialist,
Office of External Affairs;
Bob Abbey,
Jackson District Manager;
Bill James,
Public Affairs Officer,
Jackson District;
Gary Bauer,
Milwaukee District Manager;
Jim Boylan,
Public Affairs Officer,
Milwaukee District.

Bureau of Land Managenent
BLM Eastern States
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Phone (703)440-1700
FAX (703) 440-1559

BLM Eastern States utilizes its proximity to the majority of the nation's population to become the outreach are for the Bureau. Eastern States introduces and educates easterners to their public lands and resources administered by this agency. The unique mission and focus of Eastern States is displayed in its showcase exhibit.

Promoting Collaborative Leadership- is evident through partnerships with private industry in the Wild Horse and Burro Adoption Program; through interagency cooperation in the leasing of lead and zinc on National Forest land; through interaction with state governments via the Eastern Lands and Resources Council; and through agreements with Bureau of Indian Affairs, National Park Service, U.S. Forest Service, and private survey associations for boundary survey work and instruction on the Public Lands Survey System.

Several special events focus on **Serving Current and Future Publics** including: Kids' Fishing Day, Special Kids' Fishing Day, and Fishing Has No Boundaries that help teach responsible outdoor recreation to economically and physically-challenged youngsters and adults; the Environmental Education Camp combines classroom instruction with on-the-ground experience for youngsters interested in natural resource conservation and land management.

Maintaining Healthy Ecosystems- is shown through major efforts like the Lake Vermilion, Minnesota, Coordinated Resource Management Plan, the Michigan and Florida Lighthouse Withdrawals, or the Florida Resource Management Plan, and through efforts to protect endangered species such as the minuscule American Burying Beetle. These efforts showcase BLM's commitment to responsible land management through cooperative efforts with State governments to sustain the integrity, biological diversity and productivity of the ecosystems while maintaining their recreational, cultural, and natural values.

Eastern States' cooperative efforts for recruitment with several eastern Historically Black Colleges and Universities (HBCUs), such as "BLM N U," demonstrates one of many endeavors to improve education and technology and to maintain a *Diverse Work Force.*

Improving the Way We Do Business is the focus of the General Land Office Records Project where more than 5 million historic documents are being computerized for the benefit of the public. Also, we have relocated oil and gas inspection functions closer to "the action" to enable both BLM and industry to conduct operations more efficiently and with a better understanding of respective philosophies.

Showcase content: As a supplement to the showcase, Eastern States produced a synopsis of the exhibit which provided the leadership, background, and the sites throughout the 31 States where each Summit theme is represented. The supplemental handout is attached as Figures A-1 and A-2.

BLM Eastern States - *31 States of Innovation!*

1993 Statistics

Leadership

State Director	Carson W. Culp, Jr.
Associate State Director	Larry Hamilton
Chief, External Affairs	Terry Lewis

Locations

State Office:
7450 Boston Boulevard
Springfield, VA 22153
(703) 440-1700

District Offices:	
Jackson, MS	Bob Abbey
(601) 977-5400	District Manager
Milwaukee, WI	Gary Bauer
(414) 297-4400	District Manager

Resources Managed

Eastern States has responsibility for Federal resources in 31 states adjacent to the west bank and east of the Mississippi River. This area is home to more than half the population of the United States.

Surface Acreage	30,000
Subsurface Acreage	39,000,000

Renewable Resources

- Land Use Planning
- Recreation Resources Management
- Cultural Resources Management
- Fish and Wildlife Habitat Management
- Riparian-Wetlands Management

Lands/Cadastral Survey

- Custodian of 5 million Land Patents and 130,000 Cadastral Survey Plats and 5,500 volumes of Field Notes
- Congressional survey responsibility for all Federal lands
- Custodian of unsurveyed lands
- Historic lighthouse properties in Florida and the Great Lakes

Minerals Production

- Major lead and zinc mines in U.S.
- 25,000 oil and gas leases on file
- 1,706 completed zones on oil and gas wells

Wild Horses and Burros

- Major marketing outlet for the BLM's wild horse and burro adoption program

Figure A-1.

BLM Eastern States - *31 States of Innovation!*

1993 Statistics

BLM, Eastern States uses its proximity to the population centers in the East to encourage stewardship and the wise use of land and resources and to increase public awareness of BLM's mission and programs. Emphasis is placed on cooperation with other agencies, industry, and private organizations to develop environmental education efforts, to publicize BLM recreational opportunities and conservation activities, to assist in the promotion of tourism, and to increase public involvement in BLM's stewardship of the nation's lands and resources. The following represents some of Eastern States' most innovative projects:

Promoting Collaborative Leadership

- Partnerships with private industry in the wild horse and burro adoption program - ALABAMA, KENTUCKY, TENNESSEE;
- Interagency cooperation in the leasing of lead and zinc on National Forest land - MISSOURI;
- Interaction with state governments via the Eastern Lands and Resources Council - 31 EASTERN STATES;
- Agreements with BIA, NPS, USFS, and private survey associations for boundary survey work and instruction on the Public Lands Survey System - ARKANSAS, DISTRICT OF COLUMBIA, FLORIDA, MARYLAND, MINNESOTA, VIRGINIA, WEST VIRGINIA.

Serving Current and Future Publics

- Kids' Fishing Day - DISTRICT OF COLUMBIA, MARYLAND, and VIRGINIA;
- Special Kids' Fishing Day - MARYLAND
- Fishing Has No Boundaries - WISCONSIN
- Environmental Education Camp - MISSISSIPPI

Maintaining Healthy Ecosystems

- Resource Management Plans - FLORIDA, MINNESOTA;
- USCG Lighthouse Withdrawals - MICHIGAN, FLORIDA;

Diverse Work Force

- Cooperative efforts for recruitment with several eastern Historically Black Colleges and Universities- FLORIDA (Florida A&M), MISSISSIPPI (Jackson State University and Hinds Community College)
- "BLM'N' YOU" - Cooperative agreements to develop the means to encourage minority students to pursue higher education ; to improve quality of resource management and public service; to expand student participation in BLM internships and to integrate human dimension issues into ecosystem management - MAINE (University of Maine), NEW YORK (Cornell University, State University of New York-Syracuse), VIRGINIA (George Mason University), and WISCONSIN (University of Wisconsin).
- Recruitment Outreach at events such as the National Association for Equal Opportunity in Higher Education (NAFEO) - DISTRICT OF COLUMBIA.

Improving the Way We Do Business

- The General Land Office (GLO) Records Automation Project brings a new dimension to the formerly tedious task of researching title documents and genealogical records. For example:

  Pre-1908 homesteads and patents for ARKANSAS, FLORIDA, LOUISIANA, OHIO, MICHIGAN, MINNESOTA, MISSISSIPPI, and WISCONSIN have been automated; completion of the remaining eastern public domain states and the serialized patents should be accomplished by 1998;

  Modem access for all automated states is available with appropriate communications hardware and software;

  The data for Homesteads and Land Patents dating before 1908 for ARKANSAS, FLORIDA, and LOUISIANA are available from the Superintendent of Documents, Government Printing Office for $15 each. CDs will be issued for the other states as automation continues.

- Relocation of oil and gas inspection functions to the areas where industry conducts operations improves the way we do business - ARKANSAS, OHIO.
- Adoptions of wild horses & burros throughout the eastern United States.

Figure A-2.

The Blackfoot Challenge

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The Blackfoot River, its tributaries and the valley in which it flows, are elements of a unique ecosystem. Glaciers heading in what is now the Bob Marshall Wilderness formed this valley about 10,000years ago, and what remains today is a landscape of 10,000foot peaks, timbered slopes at mid-and lower elevations, and glacially formed potholes and wetlands near the valley floor. A network of thousands of miles of perennial streams provide water to the 132mile long Blackfoot River. Not only is the Blackfoot Valley a breathtaking landscape with rich natural resources, it also sustains diverse and viable rural communities as it has for more than a century.

Lands within the Blackfoot River Basin are owned and managed by a variety of interests including the Bureau of Land Management, Forest Service, Plum Creek Timber Company, Inc., and the State of Montana. In addition, private ownership accounts for about a fourth of the dredge in the valley. This mixture of ownership and interests presents a situation where coordinated efforts are needed to ensure a balanced management approach.

In the fall of 1991, agencies, organizations, business and industry representatives, and private landowners gathered to share their ideas and concerns for the Blackfoot Valley. Response to the meeting was overwhelming, and a second meeting was held the next spring where ground work was laid to create a more structured organization. In January, 1993, consensus was reached on a mission statement and goals. A Steering Committee was formed and the Blackfoot Challenge was born.

From the beginning, a collaborative, voluntary, and open approach was sought to help resolve issues and capitalize on opportunities. Protecting the rural lifestyle and economic health of the Blackfoot Valley remains a central concern.

Mission Statement. The Blackfoot Challenge is a forum that promotes cooperative resource management of the Blackfoot River, its tributaries, and adjacent lands. Our mission is to coordinate efforts that will enhance, conserve, and protect the natural resources and rural lifestyle of the Blackfoot River Valley for present and future generations. We support environmentally responsible resource stewardship through the cooperation of public and private interests.

Goals.

- provide a forum for the timely distribution of technical and topical information from public and private sources.
- foster communication between public and private interests to avoid duplication of efforts and capitalize on opportunities.
- recognize and work with the diverse interests in the Blackfoot Valley to avoid confrontation.
- examine the cumulative effects of land management decisions and promote actions that will lessen their adverse impacts in the Blackfoot Valley.
- provide a forum for public and private resource managers to resolve issues.

Membership. There is no formal membership in the Blackfoot Challenge. Participation is open to local governments, state and federal agencies, business, private corporations, individuals, and other organizations that support the mission of the Blackfoot Challenge.

The Blackfoot Challenge and the BLM Summit: What's the connection?

Promoting Collaborative Leadership. The Blackfoot Challenge operates through eight committees. The Executive and Steering Committees, which guide the Challenge, are each made up of landowners, private conservation groups, corporations, and federal and state land managers. Both of these committees are presently chaired by private landowners and operate through consensus recommendations. A professional facilitator/executive director is employed on a half-time basis to implement actions and coordinate Challenge activities.

Serving Current And Future Publics. Several of the projects sponsored by the Challenge have linked land management decisions and actions on different ownerships. These cooperative efforts have increased operating efficiency, accelerated resource recovery, and brought to light new opportunities for solving problems in the watershed. Improved fish populations, increased river access, and increased hunting access on privately owned lands are some examples of how today's public is being served. By building on this tradition, future publics will continue to reap both the tangible and aesthetic benefits of sustainable resource management.

Maintaining A Healthy Ecosystem. Addressing BLMs ecosystem management principles is a fundamental part of the Challenge's work:

...sustaining productivity and diversity- The current focus is on the need to sustain or improve water quality, native fish populations, riparian, wetland and aquatic habitats, address the needs of individual species that are in serious decline and prevent landscape fragmentation. At the same time, the group recognizes that healthy human communities depend on the use and conversion of natural resources at sustainable levels.

...using the best available scientific information- The Challenge strives to apply the "best science" by staffing projects with technical experts, through improved communication, by sharing existing information, and by coordinating the collection of new data among agencies and making existing data more readily accessible.

...involving the public and coordinating with other landowners- This is a grassroots initiative; while federal and state agencies have fully participated from the outset, the Blackfoot Challenge group has been strongly influenced by local landowners and not by a process or set of guidelines handed down from above. Balanced representation of interests on various committees is mandated in the bylaws. Town meetings, annual meetings, and workshops have been held throughout the basin. A newsletter and other outreach methods are being used regularly.

...determining desired future ecosystem conditions- A systematic attempt to identify desired future conditions, the Upper Blackfoot Landscape Analysis, is currently under way. It will be completed in 1995. This analysis will provide a reference for historic conditions, a "snapshot" of present conditions, and identify desired future conditions. A similar effort for the lower basin will follow.

...working to minimize and repair impact to the land- Wetland/grassland protective easements and conservation easements are in place for over 35,000acres of private lands, the acreage continues to expand. Current efforts to protect water quality, riverine corridors, and species of special concern, tocontain invasive plants and to transfer sound

technology to landowners will all lessen adverse impacts on the land.

...adopting an interdisciplinary approach- Specialists in natural resources, social sciences, and economics have all contributed to the work. To date, BLMs fisheries, wildlife, watershed, forestry, and weed management programs have been most involved. Grouping technical experts, land owners, and managers from a variety of organizations and encouraging citizen participation are hallmarks of the Challenge's eight committees.

...basing planning and management on long-term horizons and goals- One of the fundamental reasons for this group's formation was to achieve long-term resource management goals. Some of the basin-wide improvements sought may require decades to achieve, but some "show-case" projects are already in place which offer practical examples of what can be accomplished. These show-case projects have proven very cost effective and the biological response has often exceeded expectations.

...reconnecting isolated parts of the landscape- Because private lands in the basin are still held as relatively large blocks of agricultural or industrial timber lands, the emphasis is on preventing fragmentation of the landscape. In addition, the cooperative nature of many of the projects has effectively reconnected parts of the landscape which previously were "jurisdictionally-isolated," but geographically adjoining.

...practicing adaptive management- Several federal and state agencies are represented on both the Steering and Executive Committees. Through the consensus building process, many opportunities have emerged which reduce duplicative efforts and increase efficiency.

Private/public partnerships are being formed to link noxious weed control/management project areas. By integrating chemical and biological control with prevention strategies across ownerships, the effectiveness of individual efforts is increased.

Diversifying Our Work Force. The Challenge group deals with issues outside the jurisdiction of any one agency and, as such, is not directly working toward BLMs work force diversity. A diversity of thought, opinion, and cultural belief is, however, embodied in the Challange's membership. There are eight committees, all of which are comprised of a variety of professional, technical, and lay people representing rural and urban environments, various state and local agencies, private and corporate business interests, etc. As a result of the committees' work, not only technical information is exchanged, but a variety of viewpoints are exposed in a constructive, problem solving atmosphere.

Improving The Way We Do Business. Through cooperative project planning and funding, the Challenge and it's members have already been successful in securing private and matching funds to finance projects that would otherwise have been unfunded. Because many of these projects include a mixture of public and private lands, the private funding has been essential to completion of some projects.

In addition, the exchange of information between various entities often leads to a discussion of business practices used by one organization that can be borrowed for use elsewhere. Brainstorming sessions have led to innovative solutions, better recognition of what obstacles block a project and how they can be removed.

BLACKFOOT CHALLENGE FACTS:

GEOGRAPHIC AREA AND NATURAL RESOURCES

- Blackfoot River Drainage 1,500,000 acres
- Blackfoot River (Length) 132 miles
- Perennial Streams (Tributaries) 2,500 miles
- Major Products and Land Uses
  - Timber management,
  - Ranching,
  - Mining,
  - Recreation
- Wildlife Habitat
  - Elk,
  - Deer,
  - Moose,
  - Bighorn Sheep,
  - Grizzly Bear,
  - Bald Eagle,
  - Bull Trout,
  - Westslope Cutthroat Trout

ACCOMPLISHMENTS (1992-1994)

- Hired Executive Director (private funding)
- Fee Title Acquisitions BLM 3,700 acres
- Conservation Easements held by members 35,320 acres
- Wetland Restoration 288 acres
- Wetland Enhancement 527 acres
- Wetland Established 23 acres
- Riparian Enhancement 13.2 miles
- Stream Channel Restoration 16.5 miles
- Native Prairie Reseeding 160 acres
- Fish Passage Barrier Removal 150 miles
- Erosion Control-Roads 17 miles
- Sponsored riparian grazing management and weed control workshops
- Sponsored Forestry best management practices workshops
- Conducted six community meetings
- Bull Trout Telemetry Study
- Fish Friendly Irrigation Study
- Coordinating chemical and biological noxious weed control efforts on 32,000 acres
- Instrumental in adding site-specific hunting district designed to reduce elk numbers/crop damage on private land
- Four Baseline River Study Reports
- Project Funds Expended: Non-Federal $1,410,000, Federal $350,000

Campbell Creek Environmental Education Center

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Introduction- Anchorage educators and citizens identified the need for an environmental education center with overnight accommodations in a natural setting located in or near Anchorage. Presently, Anchorage has facilities for day field trips in the local community, but no overnight facilities are located close to the urban area. Environmental education programs located outside of Anchorage in a rural or wild Alaskan setting are too costly for many students to attend, especially disadvantaged and low income students. Scoping by the BLM and educators revealed there was also a need for overnight low cost facilities that can be used by "bush" Alaskans as well as groups visiting Alaska for the purpose of environmental education. The goal of the center will be to immerse students in outdoor and interactive activities so that they may feel comfortable in the out-of-doors, and learn about ecosystem management and land-use ethics.

Project Development- The BLM, Anchorage District and the Campbell Tract, has an established tradition of environmental education. Since 1975, the BLM and the Anchorage School District (ASD) have co-sponsored Outdoor Week, an event in which all the ASD 6th-grade students come to Campbell Tract for a day of outdoor studies and activities such as water ecology and fly tying, orienteering, and mineralogy and gold panning. This is a partnership event with presenters coming from many private and public organizations such as Trout Unlimited, the Bureau of Mines, the U.S. Fish and Wildlife Service, and the BLM.

In 1987, the Anchorage District was approached by Anchorage educators and the Anchorage Committee for Resource Education with a proposal to build the Campbell Creek Environmental Education Center on the BLM's Campbell Tract. The BLM subsequently incorporated the proposal into the 1988 Management Plan for Public Use and Resource Management on the BLM's Campbell Tract Facility. After years of program planning, the Bureau of Land Management is now developing the CCEEC in partnership with the Anchorage Committee for Resource Education, the Anchorage School District and many other public agencies and civic organizations.

The CCEEC will be built on the BLM's Campbell Tract, a 730 acre wildland parcel located in southeast Anchorage. The Campbell

Tract is managed by the BLM as a Special Recreation Management Area for non-motorized public recreation and education. Campbell Tract is part of the largest block of undeveloped property in Anchorage with the 5,000 acre Far North Bicentennial Park bordering it on the north, east and south. The Tract has a natural undeveloped setting with several diverse habitats such as mixed forest, hardwood forest, fresh water stream, and riparian areas that are representative of southcentral Alaska. In summary, Campbell Tract is an ideal outdoor learning laboratory.

Facilities will be built to support outdoor interactive environmental education activities. The CCEEC will be able to accommodate 84 persons overnight in facilities that include a multi-purpose building with kitchen, multi-purpose room, classroom, offices, storage and caretaker's efficiency apartment and two detached dormitories. Other facilities are an interpretive trail that will be accessible to persons that are physically challenged, an environmental education trail to access a variety of habitats year-round, an outdoor amphitheater, weather station, observation deck, access road and parking, ski/foot bridge over Campbell Creek and information signing on trails. The design of the buildings, access and parking, and landscape was completed in March, 1994. The facility is expected to open in 1995. The trail systems and other site developments will be designed and constructed as funds become available.

Partnerships- In FY 93, $40,000 were awarded to the CCEEC project through grants. The BLM worked with foundations, the Anchorage Committee for Resource Education and the Alaska Natural History Association, the Anchorage School District and civic groups to hire an environmental education curriculum expert. The result is a 6th-grade-level curriculum for a 2-1/2 day educational experience which focuses on natural environmental processes and cycles. Funds for the curriculum development were awarded by the U.S. Forest Service and the Minerals Management Service. ARCO Alaska donated $9,000 for education equipment and awards for student excellence.

Numerous hours were donated by educators and students to help with many projects for the CCEEC and on Campbell Tract. This included grant writing, gifts of materials and printing for posters, curriculum development, plant identification, habitat mapping, and trail building.

Operations- The CCEEC will operate year-round. A priority listing for users will be developed. Environmental education programs for the school districts will be the top priority use but other uses will also be accommodated. The BLM is committing three education program staff and maintenance personnel to the CCEEC operations. Community support through volunteers, teachers in training, materials and equipment donations, and scholarship assistance is also expected. A nominal user fee is expected to be charged.

The BLM is implementing a Limits of Acceptable Change (LAC) system to monitor the Tract's resources and the quality of the visitor experience. The success of the CCEEC will be dependent on maintaining a natural setting for the outdoor environmental education activities. Through LAC, the public and the BLM will determine the natural resource and visitor experience conditions that are desired. Visitor use management decisions will be based on a monitoring program that is designed to measure key environmental and visitor experience elements.

The Canyon Country Partnership

Working Together to Sustain Ecosystems and People on the Colorado Plateau

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Introduction. Human settlement of the Colorado Plateau has historically been supported by use of the region's natural resources. In recent years, however, the Plateau has been experiencing an unprecedented "boom" in land-use demands. This has been fueled largely by explosive growth in recreation and tourism, typified by a 300% increase during the past five years in the area of Moab, Utah. Oil and gas activity, film permitting and residential development are escalating as well. These expanding uses occur alongside and often conflict with traditional activities such as grazing and mining. Cumulative impacts from all of these land uses are contributing to rapid deterioration of sensitive resources, especially in areas where such uses are concentrated.

Most of the Plateau is either in State or federal ownership. Attempting to meet user demands often causes conflicts among the managers of these varied lands, and among segments of the public. Many communities have become highly polarized over land-use issues, and many proposed management actions have been subject to time-consuming, costly protests.

As a result, land and resource managers of the Plateau must wrestle with a dilemma that becomes ever more acute: How do we manage the land to derive multiple, often competing values now, *and sustain the ability* of the land to continue providing such values for our descendants as well as ourselves?

The Canyon Country Partnership. The Canyon Country Partnership ("Partnership") is a local-level initiative dedicated to working on these issues. The Partnership's major aim, as stated in its Charter, is to maintain the basic health and sustainability of ecosystems, *and* serve the needs of people who depend on such ecosystems for commodity or non-commodity values.

The Partnership has two features that set it apart from many similar-looking local efforts. First, it has a strong *scientific emphasis* as a foundation for defining ecosystem health and identifying society's needs. Second, it deliberately seeks the *broad involvement* of more than the region's land/resource management agencies. The Partnership involves the public at large, County governments, and various groups — essentially all who have a stake in long-term management of the Plateau and

who can bring skills to promote such management.

The geographic scope of the Partnership encompasses a four-county area in the heart of southeastern Utah's canyon country. However, the Partnership will "chase" land-use issues beyond this administrative four-county area as needed.

The Partnership is a collaborative process for dealing with issues and concerns that cross jurisdictional boundaries. Land and resource managers, special interests, and the public work together toward mutually agreeable solutions to contentious problems resulting from the ever-increasing demands on the Colorado Plateau. It is truly a grass-roots effort that is receiving support from many of the historically polarized groups in the area.

The structure of the Partnership consists of four components: the Forum, the Science Committee, the Data Standards Group, and Issue Committees. These are described briefly below.

Forum: The Forum is made up of land/resource managers and elected county commissioners. The Forum meets publicly to discuss agency planning and management actions, and to address issues and concerns expressed by the public. Members of the Forum include management-level representatives from:

- BLM Moab District
- San Juan County Commission
- Canyonlands National Park
- Utah Division of Wildlife Resources
- Manti-LaSal National Forest
- Utah Division of State Lands
- Carbon County Commission
- Utah Division of Oil, Gas and Mining
- Emery County Commission
- Utah Division of Parks and Recreation
- Grand County Council

Science Committee: This is a standing committee comprised of scientists with an interest in the composition and functioning of the Colorado Plateau. The Science Committee assists the Forum and land/resource management agencies with scientific analysis of short- and long-term effects of management actions. In addition to technical representatives from Forum-member agencies listed above, the Science Committee has members from:

- Utah State University Extension Service
- National Biological Survey
- U.S. Fish and Wildlife Service
- BLM Grand Junction Resource Area
- The Nature Conservancy

Data Standards Group- This is a standing committee comprised of computer and automated mapping specialists. The Data Standards Group assists and advises the Forum and Science Committee on the collection, generation and standardization of GIS and other automated information. In addition to technical representatives from Forum-member agencies listed above, the Data Standards Group has members from:

- Utah Automated Geographic Reference Center
- Ashley National Forest
- Uinta National Forest
- BLM Vernal District
- Capitol Reef National Park

Issue Committees- Issue committees are *ad hoc* groups comprised of individuals from agencies, special interest groups and the general public with interest in specific issues or concerns. These committees investigate the issues and make recommendations to the Forum. As of June 1994, the Forum has formed four Issue Committees to deal with:

- Regional recreation strategy development
- Recreation impacts funding
- Rivers management
- Aircraft scenic overflights

The structure of the Partnership fosters a more efficient and productive way for its members to do business by: (1) enhancing communication between land and resource managers, including the private sector; (2) eliminating duplication of efforts through coordination of management activities; and (3) sharing physical resources on projects, such as staff, expertise and equipment.

Sustainable Land Management. As stated above, the major aim of the Partnership is to achieve land management that: (1) maintains the basic health and sustainability of ecosystems, and (2) serves the sometimes-competing needs of people who depend upon such ecosystems for commodity or non-commodity values. This process has widely been called "Ecosystem Management", but could

also be termed *sustainable land management*. The process can be understood more clearly when its parts are shown visually in the following diagram, adapted from Jensen and Everett:

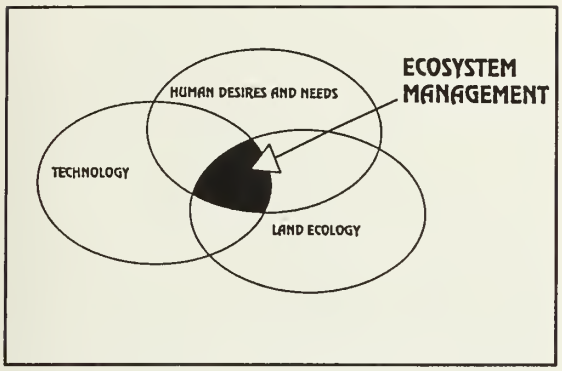

Figure 1. Ecosystem Management

The shaded area where the three ovals overlap represents a set of possible land-use allocations that: (1) meet human desires and needs, *and* (2) the land is able to maintain, *and* (3) are technologically possible. This is the model that will best enable us to pass on land-use opportunities to future generations.

The Partnership is ideally suited to undertake the process of sustainable land management. The Partnership's structure and operating methods were designed to foster coordination among its diverse members, which is critical to the success of this process. In addition, the Partnership's Science Committee has begun to develop strategies for meeting two major information-needs for sustainable land management:

1. Land Ecology: A five-year project that would obtain information about the composition, functioning and potential of the land. Known as an "Ecological Characterization", this project would provide a scientific foundation for identifying uses that the land is able to maintain, thus effectively defining the Land Ecology oval in the preceding diagram. This project would also make the information available in a standardized format, able to be shared by all of the land owners and managers who will use the results. The project would begin as a demonstration effort in the core of the Colorado Plateau, and be expandable to achieve similar results across the entire Plateau.
2. Social Desires and Needs: A project to identify society's desires and needs for deriving benefits from the land, starting in a limited way with recreation but expandable to other human land-use desires. This would define the "Human Desires and Needs" oval in the diagram.

Conclusion- The strength of the Canyon Country Partnership lies in its grass-roots origin. It was formed in response to local and regional issues, and thrives by addressing and resolving those issues. The Partnership has a great deal of energy flowing into it, and promises to be a viable and exciting means of dealing with the difficult land-use decisions facing the Colorado Plateau.

Changing With The Times

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Changing With The Times was implemented by Arizona BLM to move forward in specific areas which will improve the delivery of services, simplifying processes and procedures such as production measurement systems, and promoting manager accountability. The overall statewide organization remains in three tiers, consistent with the entire bureau, however organizational improvements have been made at all three levels. Changes in critical processes are also being made to support the changed roles and responsibilities. Actions taken reflect the fact that resource areas are the primary building block of the organization. To a large degree, the role of most organizational units of the district and state offices is to support the on-the-ground work that is accomplished at the resource area or field level. In addition to carrying out BLM's primary multiple use mission on the ground, the Area Managers and other resource area personnel work consistently with the local customers and public land users. They are, accordingly, the first line of contact by most publics.

Four specific outcome areas have been addressed to improve Arizona's organization:

1. The state office has been streamlined to improve efficiency and effectiveness.

2. The district office Division of Resources was abolished, eliminating overlapping efforts and statewide move these positions from the districts to the resource areas.
3. Internal issues are the focus of an Associate District Manager and at least two Resource Advisors in each district.
4. An improved organizational structure has been established with supervision by two to four Branch Chiefs in each resource area.

In addition to the new organizational structure of Arizona BLM, five other issues are also a part of Changing with the Times:

- Development of an integrated budget system
- Changing from Program Leaders to Senior Technical Specialists
- New challenges for Human Resources
- Performance Measures as a part of the budget process
- Improving local business practices

Streamlining the budget process is being done by creating a base of funding for each

office below the State Office without identifying subactivites. PYBP is replaced by a new process (Strategic Budget Development) that focuses on issues or changing demands that are ecosystem oriented. PAWP is developed from the field level up using ecosystem and interdisciplinary concepts with no constraints to individual subactivities. Field office budgets focus on projects or accomplishments for meeting ecosystem or geographic area objectives while maintaining day to day operations and public service. Accomplishments are developed utilizing new concepts and used to portray outputs in budget development and budget execution. Budgets are allocated on base funding, a consolidated budget without subactivity restrictions. Offices are held accountable for FTE and travel ceilings, total operations budget, project expenditures, and significant accomplishments. The monetary phase of budget execution is centralized and produces automated updates available at the touch of a key.

The state office Program Leaders, now called Senior Technical Specialists, have a role change from budget subactivity tracking to budget development with increased emphasis on providing technical assistance to field offices. They provide quality assurance instead of quality control; strive for consistency in the state; and allow accountability for accomplishments to be at the district and resource area level. Senior Technical Specialists are also the liaison with the Washington Office and interpret and respond to new initiatives and major program thrusts. Overall, they focus on coordination, development, and evaluation in support of the state program and mission.

Human resources are a key to implementing changes and keeping a capable, well-trained, and highly motivated work force. Keeping employees well informed and actively involved in the process of change is a primary concern. Streamlining personnel management practices and processes are highly important to the effective and efficient success of the program. Paperless personnel action processing; elimination of KSAs when applying for Arizona BLM positions, establishment of a personnel users advisory group to ensure expeditious service and continual refinement of personnel processes, and strengthening recruitment efforts by utilizing authorities available to ensure we reach and consider a wide and diverse pool of applicants for available positions are all actions being implemented. Enhancing employee empowerment is accomplished by challenging employees to help with change, determine and implement new concepts in public land and resource management. Greater emphasis is placed on programs to improve the quality of life, through the Human Resources Development Committee. A long range strategy has been designed for obtaining and developing the work force skill mix that Arizona BLM will need in the future.

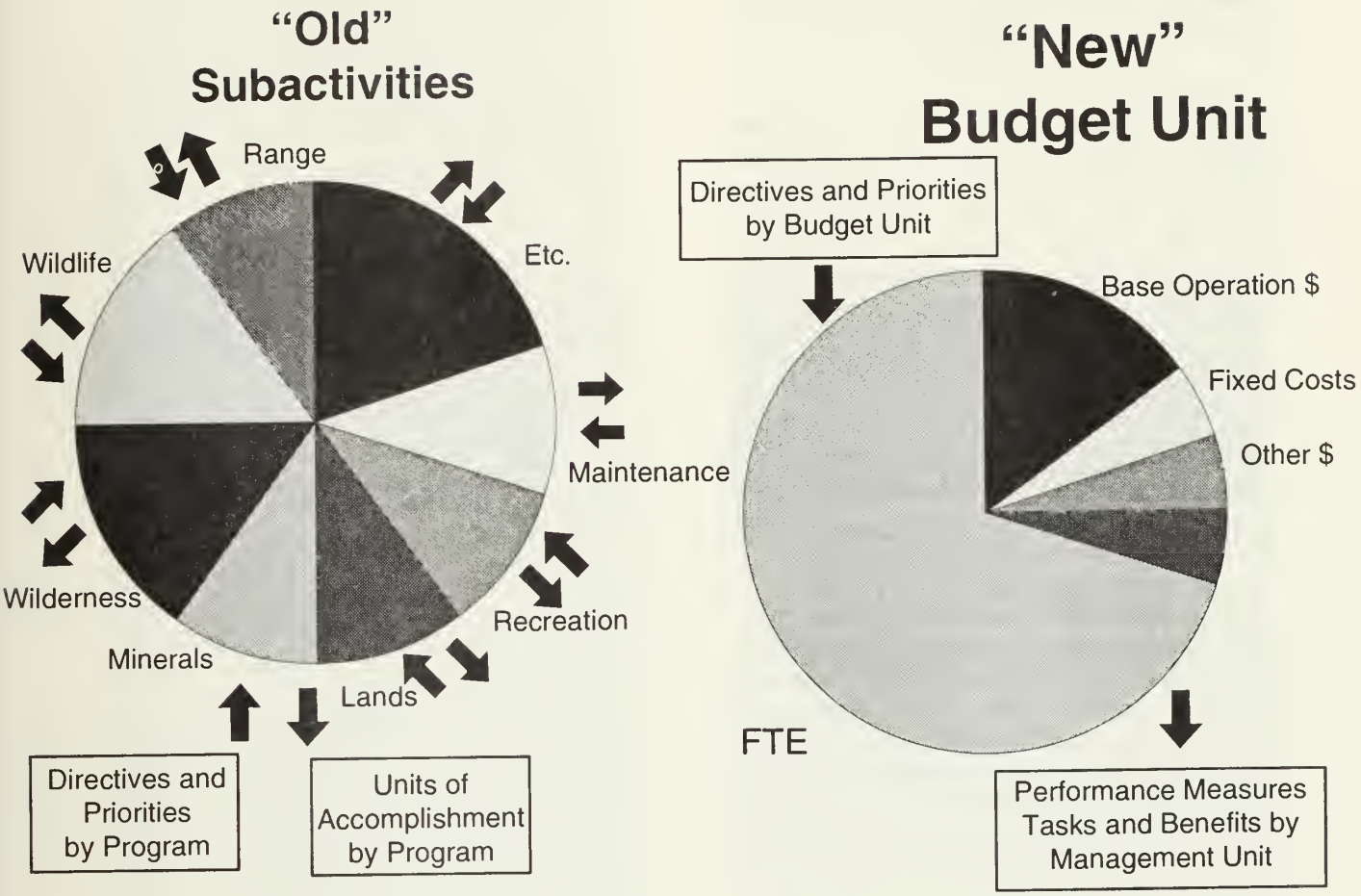
Performance measures are an integral part of the budget process that shifts from activities to results. Empowerment of the resource areas invokes them with the responsibility of completing the entire process. Work is evaluated in six performance categories: service and support; environment quality; economic benefits; social and cultural benefits; special resource protection and management, and education.

The focus on improving Arizona BLMs local business practices has been directed toward finding ways to increase efficiency and effectiveness while trying to direct additional capital into areas where BLM has a presence. A process has been developed to minimize paperwork and expedite reimbursements for travelers. Time and attendance reporting is designed to be more efficient has been designed, and a substantially improved procurement process capitalizes on modern automation capabilities.

The approach used has direct applicability in the Summit themes. Promoting collaborative leadership is a major the focus of *Changing with the Times*, the program of re-engineering for quality in Arizona. It recognizes more empowerment, less entitlement, expanded opportunity not bureaucracy. Changes are coming from within the organization, putting more resources – people and dollars – in the field to do more of the on-the-ground work for which BLM is intended. Authority, responsibility, and accountability are placed closer to the resources to be managed. Empowerment of all employees comes through increased delegation, additional flexibility and discretionary authority, and ability to make decisions closer to the ground.

Serving current and future publics is incorporated in the program's overall goal to implement statewide an organization, processes,

Changing With The Times
Arizona BLM



Interdisciplinary Management

Figure 1.

and overall operations that are more effective, efficient, and in tune with modern concepts, public service needs, interdisciplinary approach to ecosystems management, and changing public attitudes on how the public lands should be managed.

Maintaining healthy ecosystems in the Arizona BLM concentrates on increasing field presence to apply ecosystem principles and ensure better land and resource management decisions and more responsive management practices. Priority in funding, staffing, and support are assigned to expeditiously resolve resource problems. Interdisciplinary planning is emphasized to ensure a more holistic approach to finding solutions to the public's issues and concerns.

Diversifying our work force, while maintaining the BLM three-tier system, is accomplished by improvements at all three levels. Changes have occurred in critical processes to support changed roles and responsibilities. Actions taken reflect that resource areas are the primary building block of the organization. Organizational units of the district and state office suppport the on-the-ground work at the resource area or field level. Meeting BLM's primary multiple use mission on the ground, Area Managers and other resource area personnel work constantly with local customers and public land users, and are the first line of contact with most publics.

Improving the way we do business is being done with budgets, business practices, and human resources management. The entire budget process has been simplified – people spend less time tracking dollars and managers have a consolidated budget without subactivities.

Colorado's Owl Mountain Project Partnerships For Total Ecosystem Management Seeking Common Ground

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A big game and livestock symposium was held in Sparks, Nevada, in September 1991. The intent was to explore long-term opportunities and benefits which might be attained through cooperative efforts. The symposium was sponsored by federal land management agencies and interest groups.

Photo 1. Owl Mountain.

The sponsors saw the need to perpetuate the efforts and enthusiasm generated at the symposium. From their ranks they formed an ad hoc group to better address and manage interactions between livestock and wildlife. They dubbed themselves the "Seeking Common Ground Work Group." Representatives included the U.S. Forest Service, Bureau of Land Management, American Farm Bureau, International Association of Fish and Wildlife Agencies, National Cattlemen's Association, Public Lands Council, Rocky Mountain Elk Foundation, Wildlife Management Institute, and National Fish and Wildlife Foundation.

The Seeking Common Ground Work Group solicited proposals from land management agencies and private interests to achieve the following goal: "To improve and manage rangeland resources to enhance the long term benefits for livestock, big game, and other multiple uses and to effectively communicate the success."

Background- The Owl Mountain Project in North Park originated within the Habitat Partnership Program (HPP), which is a Colorado Division of Wildlife program designed to help resolve rangeland forage and fence damage conflicts between big game animals and private landowners or land management agencies. One of the main objectives of the HPP is to identify and implement habitat improve-

ment projects which will attract and hold big game animals on public or private land where conflicts do not occur.

The HPP committee submitted a proposal in 1992, requesting funding from Seeking Common Ground to provide a demonstration area for cooperative ecosystem management. One of the 40 submissions, the Owl Mountain Group's proposal, was selected and allocated $55,000. The BLM, Forest Service, National Park Service, U.S. Fish and Wildlife Service, Soil Conservation Service, Division of State Parks, Colorado State Land Board, Colorado Division of Wildlife, HPP, Colorado State University Extension, private landowners and local community members forged a committee to resolve a variety of resource conflicts.

Partnerships and Ecosystem Management- The mission of the Owl Mountain Partnership is to serve the economic, cultural and social needs of the community, while developing adaptive long-term landscape management programs, policies and practices that ensure ecosystem sustainability. The partnership is composed of public land management agencies, landowners and other interests formed to develop an integrated prototype decision-making process using the principles of ecosystem management.

Goals

1. To create partnerships that build trust and teamwork to achieve ecosystem health and resolve conflicts which will serve the economic, cultural and social needs of the community.
2. To develop and implement an adaptive ecosystem management plan across political, administrative and ownership boundaries, based on identified issues and needs.
3. To document the implementation process of ecosystem management and communicate knowledge gained from the project to partners and the public.

Project Scope- The land area encompasses approximately 375 square miles (of which 67 percent is public lands and 33 percent is private lands) in two major drainages-the Michigan and Illinois Rivers. There are 25 major ranch operations within the area as well as over 300 small ranchettes and homesites. Agriculture, logging and recreation (including outfitting and guiding) provide the bulk of the economic stimulus to communities as Walden, Gould, and Rand.

Photo 2. Grazing on the Arapaho National Wildlife Refuge.

Steering Committee- A Steering Committee has been formed to guide this effort. The makeup of the committee includes the following representatives:

Three area livestock producers
North Park Habitat Partnership Program
U.S. Forest Service
Bureau of Land Management
Soil Conservation Service
U.S. Fish and Wildlife Service
National Park Service
Colorado Division of Wildlife
Colorado State Land Board
Colorado State Forest Service
Colorado State University
Colorado State University—Extension Service
Small landowners
Area businessmen
North Park Soil Conservation District
Timber industry
Environmental community

Photo 3. Pronghorn Antelope.

Major Issues Identified Thus Far

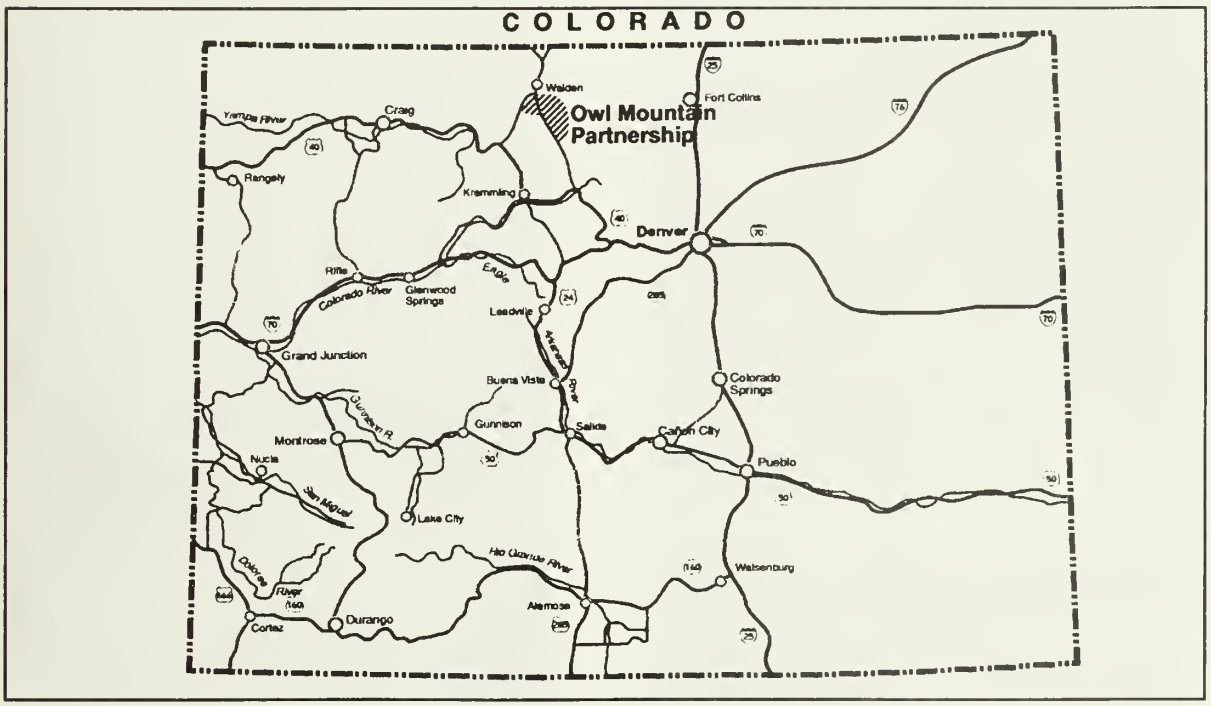
- Implementation of ecosystem principles into on-the-ground management.
- Elk populations and distributions versus livestock numbers and use.
- Competition between big game animals for existing or potential forage.
- Damage to private hay stockpiles and utilization of meadows.
- Utilization of U.S. Fish and Wildlife Service refuge by elk and impacts to nesting cover by waterfowl.
- Dramatic decline in sage grouse numbers within the study area.
- Noxious weeds and possible methods of control.
- Habitat manipulation (fertilization, spraying, burning) ... is it working.
- Transportation system (road locations use versus disruption of wildlife).
- Riparian management by key drainages.
- Improvement of the uplands watershed.

Based upon these and other issues, the Steering Committee, adjacent community members, agency representatives and area landowners spent several months refining and prioritizing objectives. Forty-eight specific objectives were developed. Several were of very high priority, including:

- Completion of a baseline vegetative aa

Photo 4. Riparian inventory.

Inventory Efforts- Inventory techniques to identify present condition of the vegetative base (for both uplands and riparian areas) and habitat requirements for livestock and wildlife (including potential productivity and nutritive quality) have been developed by a subcommittee of vegetative experts. We will focus on present condition, ground cover, plant species composition, and will correlate this data to representative plant communities. This method will be used on all lands inventoried, regardless of ownership or agency responsibility. The Steering Committee has decided to co-fund inventories needed for neotropical birds in the project area and is considering possible inventories of soil micro-organisms in the hope that such data will yield information regarding land health and sustainability. Agencies will also conduct aquatic inventories on specific stream reaches. Other inventory efforts are being considered for sage grouse and moose.



Location Map

Collaborative Management of the Mining Law Administration Program in Nevada

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The BLM in Navada has fostered a comprehensive statewide collaborative program with state agencies to manage the largest mining law administration program in the United States.

Background- In 1993, BLM in Nevada recorded 51% of all new claims and processed over 37% of all the plans and notices nationwide. Nevada produces 63% of the gold in the U.S., over one half of which comes from public lands. If looked at independently, Nevada is the third largest producer of gold in the world. The western gold rush in the 1980's and 1990's centered in Nevada; over 50 major gold and silver mines were permitted on the public lands in the last ten years. BLM manages over 48 million acres in Nevada which is about 68% of all lands in the State.

Issues such as migrating bird deaths associated with cyanide using operations, number of plastic claim posts (the Nevada "state tree"), backfilling of open pits, cumulative impacts of mining development on ground and surface water, the size of mining operations (Nevada has several of the largest gold mines in the U.S.), and lack of State reclamation laws made regional and national headlines in the 1980's. As issues developed and governmental workloads increased Federal and State agencies looked to collaborative efforts to assist in meeting their responsibilities. BLM initiated several efforts and formal Federal and State agreements. Individuals and State agencies initiated programs and collaborative efforts. Federal and State agencies also involved the various public groups in efforts to look at regional concerns from a broad perspective and many public groups looked to governmental agencies as cooperative offices. As example of the spirit which developed in Nevada is that in 1990, when Nevada passed the first State reclamation and bonding act, the State law specifically identified the BLM surface management regulations 43 CFR 3809 as the key reclamation elements in the law, and directed the implementing state agency to develop cooperative agreements with BLM to manage mining and reclamation activities on the lands in the state.

The BLM field offices have progressively developed many excellent local collaborative projects under the Statewide policies, such as the Sleeper and Marys River Projects which are addressed as showcase or case study efforts.

BLM/State Collaborative Management Efforts- BLM has developed a statewide network of interrelated formal MOUs and other cooperative activities to manage mining operations on the public and private lands. Figure 1 shows the array of the MOUs. Participants in the efforts have included industry trade groups, private companies, the Sierra Club, the Audubon Society, Nevada Wildlife Association, private consultants, private citizens and local governmental agencies.

A. Memorandums of Understanding (MOUs)

1. Nevada Department of Conservation and Natural Resources. A 1986 MOU provides for the coordination and cooperation in issuing water pollution control permits by the State of Nevada, incident reporting, monitoring and inspections, inventory acquisition, incident clean-up and research program materials management, and related issues. BLM approves mining plans of operations only if State standards such as rinsing of heap leach pads are to be met. With State cooperation, Nevada BLM developed the first State-BLM cyanide management plan.
2. Nevada Division of Environmental Protection. A 1990 MOU provides for the coordination and cooperation in processing mineral exploration and mining operation plans, reclamation, bonding, compliance/monitoring and closure requirements.

   One plan of operation format and bond form will be used by both agencies. Plan of operation review and approval will be a concurrent and simultaneous process by both agencies. One reclamation bond will be required and held by the lead agency.
3. Nevada Department of Wildlife. A 1991 MOU provides for the coordination and cooperation in processing plans of operation and issuing Nevada Industrial Artificial Pond Permits to assure the protection of wildlife resources, especially for cyanide using operations.
4. Nevada Bureau of Mines and Geology. A 1984 MOU provides for the mutual collection and sharing of mineral resource data and the transfer of technology.
5. Nevada Division of Minerals. Draft, June 1994, MOU establishs and maintains coordination for securing mine hazards and to destroy/dispose of discovered explosives at abandoned mine sites.
6. Nevada Department of Conservation and Natural Resources and the U.S. Geological Survey, Water Resources Division. an August 1994, MOU established for cooperative hydrologic investigation of the regional cumulative effects of large-scale mining operations on the water resources of the Humboldt River Basin Ecosystem.
7. Governor and all Agencies. BLM MOU requires major EAs and EISs to be reviewed by the State Clearinghouse. BLM expects over 20 mining related EISs to be completed or started in 1993-1995.

B. Cooperative Forums and Groups

1. Mineral Issues Forum. BLM, State, special interest and mining company representatives met periodically to discuss mining/minerals issues.
2. Mining Claim Monuments Forum. With a range of cooperating groups interim BLM guidelines for protection of birds was developed. The State Department of Minerals, with BLM backing, initiated a Nevada law to accomplish the same goals; the law was universally supported.
3. Excellence in Mining Reclamation Award Group. Since 1991 a group of Nevada Federal and State agencies have recommended State awards for excellence in reclamation usually given out by the Governor.
4. Joint BLM/State Plan of Operations/Bond Format Group. Development by a wide range of Nevada industry and environmental groups to prepare joint guidelines.
5. Nevada Standards for Successful Revegetation Group. BLM and State agencies with review and consultation by industry and the Sierra Club developed biodiversity and natural vegetation oriented guidelines in 1993.
6. Mined Land Reclamation Information Group. Automated data base containing information was prepared for reclamation practices in 1990.
7. Exploration Drilling Standards. BLM participated in a group to assist the State Water Engineer review and develop reasonable guidelines for protection of groundwater exploration hardrock drilling and plugging of drill holes. BLM field and state offices meet regularly with local mineral, environmental and public groups to provide information and assistance.

C. Cooperative Research Projects and Developments

1. BLM/Department of Agriculture, Agricultural Research Service, 1992. developed report (BLM funded) of 45 major mine sites on BLM administered lands in Nevada and the revegetation efforts of each mine. The resulting scientific data was used as a basis for new revegetation guidelines.
2. BLM/USGS, Water Resources Division, 1993. Cooperative Agreements were developed for USGS to complete a preliminary assessment of the potential impact of mining operations, and associated water uses on long and short term water conditions within the area of the Humboldt River Drainage Basin. A supplemental larger study is in development.
3. BLM/Nevada Department of Wildlife/ Amax Gold. 1990-1994. The Sleeper Mine Wetlands Enhancement Project. Dewatering efforts at the Sleeper Mine has allowed the development of a wetlands area 2 to 4 miles from the mine, providing a varied habitat for wildlife. The area covers approximately 4,600 acres of BLM administered land. Proposed BLM showcase.
4. Biosolids in Revegetation. Carson City District Office collaborative initiative to use Reno biosolids for mine revegetation was presented as a BLM showcase.
5. Biocyanide Remediation. With State Division of Environmental Protection lead, BLM is coordinating with the Environmental Protection Agency, State of Nevada, University of Montana and industry to experiment with bioremediation of a cyanide heap leach using specially developed "bugs".

D. Cooperative Conferences and Symposiums

1. Arid Mined Land Revegetation Symposium. (March 12-14, 1991). Was co-sponsored with the Soil and Water Conservation Society, Nevada Chapter.
2. Successful Mine Reclamation - What Works. Conference was held May 19-22, 1992. Co-sponsored with the Nevada Division of Environmental Protection, Nevada Departments of Wildlife and Minerals, U.S. Soil Conservation Service, U.S. Bureau of Mines, U.S. Forest Service, and Nevada Mining Association.

E. Cooperative Publications

1. BLM/Nevada Bureau of Mines and Geology. 1993. Outline of Nevada Mining History. Special Publication 15 was developed which summarizes Nevada mining history through 1992.
2. BLM/Nevada Bureau of Mines and Geology. 1994. Geologic tours in the Las Vegas area. Special Publication 16. A geologic guide for people as they drive the roads of the Las Vegas area. Publication contains trip guides describing the geology, cultural history and general ecological setting of each area covered in the book.

Successes, To Date- The cooperative network of regulation on the public lands has guided the development of an industry with only a few hundred thousands of ounces of gold in 1983 to the third largest producer of gold in the world. No negative appeals for large mining operations have ever been held against BLM practices. One notable success was the 1991 GAO report "Increased Attention Being Given to Cyanide Operations' which gave BLM Nevada major credit, along with State agencies, for managing the cyanide using mining industry. The Governor has repeatedly referred to Nevada Federal-State program positively in Congress. BLM Nevada now holds over $127,000,000 in mining sureties with the State, up from "zero" in 1990. The State-Federal program has been referred to as a successful model in several conferences. Although a "negative finding", no major "Summitvilles" nor serious mining environmental damage has yet occurred on BLM's watch in recent times.

Evolving Collaborative Management for Biodiversity, Ecosystems and Better Serving the Public- The on-going program is also evolving to emphasize collaborative current efforts for new major BLM initiatives and goals. For example:

- University of Nevada, BLM, wildlife and minerals state agencies, other Federal agencies and public groups are a part of a Statewide biodiversity initiative collaborating on guidelines for management of abandoned mining sites as affecting wildlife, especially bats.
- BLM initiated development of revegetation guidelines for reclamation emphasizing native species and biodiversity in collaboration with State agencies, industry and interested groups such as the Sierra Club. Both BLM and the State of Nevada

BLM/STATE COLLABORATION MATRIX-STATEWIDE MINING

State Agencys	Division of Environmental Protection		Department of Wildlife	Department of Minerals	Bureau of Minerals	BLM Responcibilities
	Mining Recclamation	Hazmat				
Permiting (Mitigation) Reclamation	X	X	X	C		
Hasardous Waste Mgt.	X	X	X			
Cyanide Mgt.	X	X	X			
Wildlife Protection	X	X	X			
Inspections (Coordination)	X	Y	X			
Bonding	X		C	X_1		
NEPA Review	C	C	C	C	C	
Information Sharing & Technology Transfer	X	X	X			
Abandoned Mine Mgt.	Y		Y	Y	SP	

X = Formal MOU; joint process of consultation/regulation
Y = MOU pending or revision in process on consultation/regulation
C = Formal MOU; comments on action (NEPA through State Clearinghouse)
X_1 = State bond pool
SP = Special projects MOU or contracts

Figure 1. = A Matrix of Formal BLM-State MOUs Which Comprehensively Foster Collaboration on Mining

Bureau of Mining Reclamation and Regulation use the same BLM initiated guidelines.

- BLM, the USGS, State Department of Conservation and Natural Resources and industry are developing a study to use the best science to identify cumulative impacts of the effects of mining on ground and surface water in the Humboldt River ecosystem.

In conclusion, BLM has taken a strong cooperative approach in addressing the issues and management of the Bureau's largest Mining Law administration program. The effort was truly a result of "collaborative" initiatives and a working spirit. There are several major successes, yet there remain major challenges in the continuing and evolving program. Collaborative management is the key to solution of management problems associated with major mineral "booms" on the public lands. Collaborative management will continue to make Mining Law reform efficient and successful in Nevada.

The Cosumnes River Preserve

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Location. The Cosumnes River Preserve is a 5,000 acre natural area in south Sacramento County, near the confluence of the Cosumnes and Mokelumne Rivers and between Interstate 5 and Highway 99 in the Central Valley. The Cosumnes River Preserve Visitor Center is located at 13501 Franklin Road, approximately 1 and 1/4 miles south of Twin Cities Road.

History of the Preserve. The Cosumnes River Preserve was officially established in 1987 with the protection of what is probably the best remaining example of valley oak riparian forest in the state of California. The Nature Conservancy first became active in south Sacramento County in 1986, when it purchased a conservation easement on 85 acres of valley oak river bottom forest. In 1987, with the acquisition of over 1,400 additional acres of property located near the confluence of the Cosumnes and Mokelumne Rivers, the Cosumnes River Preserve was officially opened. In 1988, Ducks Unlimited joined as a partner in the project. The Preserve's primary goals are to protect and restore two natural communities once abundant, but now rare in California: freshwater seasonal wetlands and valley oak riparian forest. Less than 4% of each community remains in the state.

The Cosumnes River is the last undammed Sierran river flowing into California's Great Central Valley. The free-flowing nature of the river allows frequent winter flooding within its floodplain. This natural process fosters the growth of native riparian vegetation, such as valley oak, wild grape, wild rose, and Oregon ash. In addition, freshwater tidal marsh is found extensively along the river and sloughs of the Cosumnes bottomlands. Since the removal of water control structures over 60 acres of tidal marsh have "reclaimed" an area that was once farmed, allowing the river's tidal cycle to periodically inundate the land.

One indication of the Preserve's importance is the number of special designations it enjoys from a broad spectrum of agencies and organizations. Sacramento County has proposed designating the lower Cosumnes River floodplain as a "Natural Area of Special Significance." The Cosumnes River is also potentially eligible for inclusion in the National Wild and Scenic River System. A portion of the Preserve's mature valley oak riparian woodland has been designated a National Natural

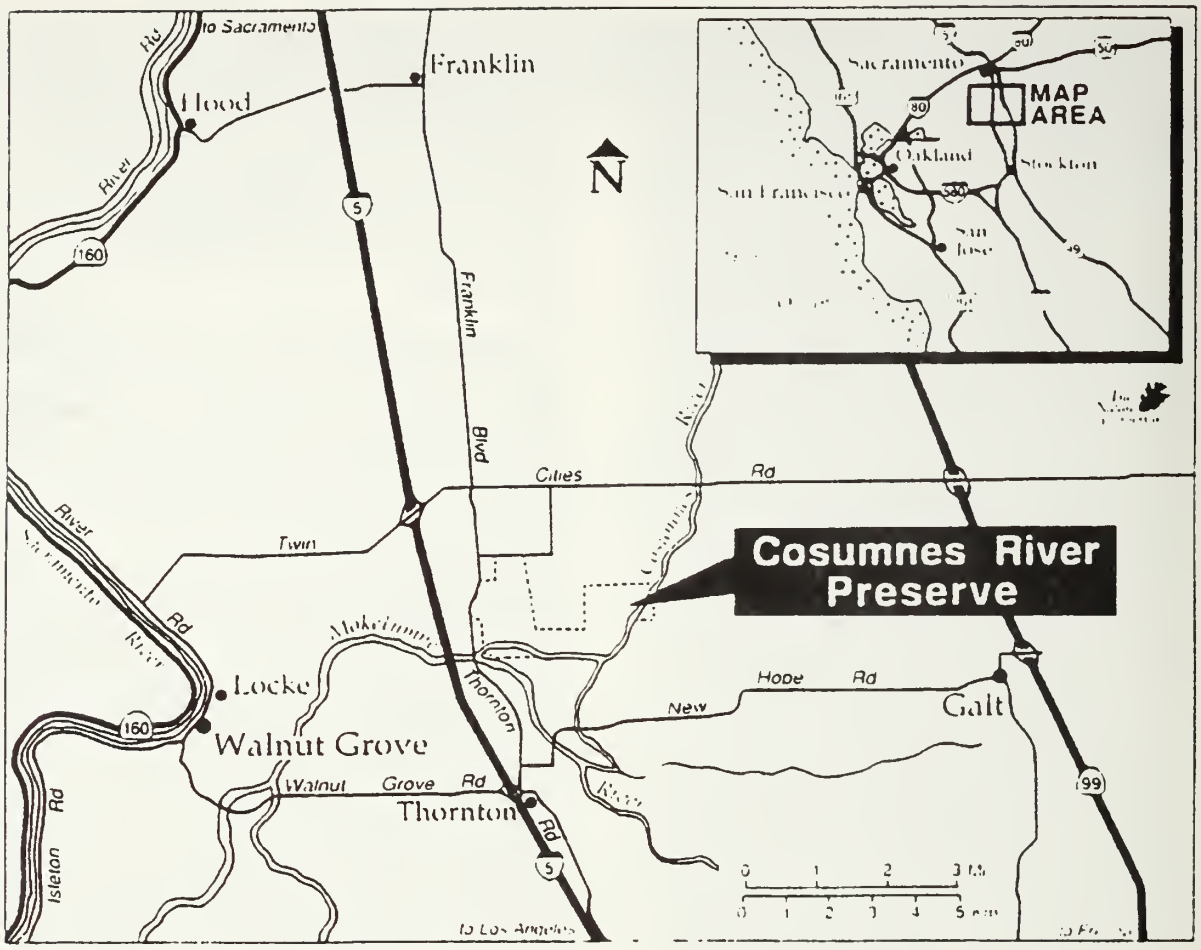

Figure 1. Consumnes River Preserve location map.

Landmark by the National Park Service. The State of California's Lands and Natural Areas Project has listed the Cosumnes as a Significant Natural Area, while the North American Waterfowl Management Plan recognizes the Cosumnes as critical for habitat protection and enhancement.

The Preserve currently encompasses 5,000 acres. Its boundaries have expanded through the efforts of the U.S. Bureau of Land Management (BLM), which joined the project as a partner in 1988 with the purchase of 150 acres of wetlands. BLM ownership in the project is now over 1,100 acres and is scheduled to exceed 1,400 acres by the end of 1994. The California Department of Fish & Game, working with the Wildlife Conservation Board, joined the partnership, after 1990 with the purchase of 840 acres of valley oak woodland and seasonal sloughs. The Sacramento County Department of Parks &. Recreation officially became a partner in spring of 1993, with the purchase of 600 acres of prime river bottom land. The American Farmland Trust is a prospective partner whose efforts will result in the protection of agricultural land, which serves as both buffer and important foraging areas for wildlife.

Common goals of all partners in the project are:

1. To protect a viable, functioning example of the valley oak riparian ecosystem;

2. Restore freshwater wetlands and provide a significant boost to populations of migratory waterfowl in the Pacific flyway; and

3. To integrate compatible human uses into management of the Preserve, particularly farming, recreation, and education.

Ecosystem Restoration. To achieve the goal of protecting a viable example of the val-

ley oak ecosystem, The Nature Conservancy has initiated a riparian restoration program at the Preserve, in which 10 native species of trees and understory shrubs are planted in areas along the river and sloughs to speed up the forest's natural regeneration and decrease habitat fragmentation. To date over 200 acres have been planted, with an additional 100 acres scheduled for restoration during autumn 1993 and 1994. For the past six years, hundreds of volunteers from Sacramento, Stockton and the San Francisco Bay area have contributed time and energy to help the Conservancy achieve its restoration goals. The volunteers, known as the Habitat Restoration Team, are among the most successful volunteer networks established by The Nature Conservancy. In addition to volunteer plantings, restoration goals now include allowing the natural flood regime to restore vast areas naturally by initiating projects that will expand the river's floodplain on the Preserve.

Ducks Unlimited and the Bureau of Land Management have focused their energies and expertise on protecting and restoring areas suitable for wetland restoration and management. Currently, approximately 1,140 acres of seasonal wetlands have been restored through both passive and active methods, and 1,025 acres are actively managed by both organizations. Management includes flooding in fall and winter for wintering waterfowl, maintenance of limited areas of permanent water during the summer as brood ponds for nesting teal, mallards and shorebirds, and irrigation of moist soil units to promote the growth of wetland species and wildlife forage. An additional 250 acres are scheduled for completion by spring of 1994. The ultimate goal is to restore 1,200 acres of wetlands at the Cosumnes River Preserve. This goal is endorsed by the North American Waterfowl Management Plan, an international agreement to increase populations of waterfowl throughout North America.

Compatible Human Use. One of the guiding principles behind the conservation effort at the Cosumnes River Preserve is the recognition that integration of human activities in this rapidly urbanizing area is essential to ensure success in the long-term. For this reason, a key element of the Cosumnes conservation plan is to protect and incorporate agricultural activities within and surrounding the wildlife areas of the Preserve. Currently, over 1000 acres of agricultural lands are managed within the Preserve.

Many historic land uses in this area of Sacramento County are compatible with maintenance of significant wildlife populations, particularly wintering migratory waterfowl. The greater Sandhill crane, threatened in the state of California, is an excellent symbol of the positive relationship between man and nature along the lower Cosumnes River. Sandhill cranes need wetlands in which to roost, however, over the years the cranes' feeding habits have evolved with changing land use practices and their favored daytime foraging areas are now irrigated pastures and farm fields where waste grain such as corn, rice, and wheat provide a diet high in protein and carbohydrates.

The Preserve has a public use program, which includes the Visitor Center, and a planned 250 foot bridge across Willow Slough onto the 3 mile Willow Slough Trail loop. In addition, a wildlife observation platform is located at the barn off of Desmond Road, and construction of a trail and boardwalk through the restored marshes of Lost Slough are scheduled for completion in June 1994. A "Friends" group, volunteer biological inventory program, and planned interpretive volunteers (docents) provide additional opportunities for people of surrounding communities to become involved in the project.

Partner Roles. As the initial organization active in the Preserve, The Nature Conservancy's focus has shifted from interest in the riparian forest to a more holistic approach of safeguarding riparian habitat, water supply and quality and other significant habitats throughout the entire Cosumnes River watershed. The Nature Conservancy is a privately funded non-profit organization, whose primary funding sources are individual donations and memberships. The Conservancy's role in the Preserve is to provide riparian restoration expertise, act as the agent for purchasing land, and to provide a land management presence. It is important to recognize that The Nature Conservancy is a private organization that purchases land from willing sellers only.

Ducks Unlimited is also a private non-profit organization, funded through individual donations and memberships. Ducks Unlimited and BLM have focused their efforts on protec-

tion of wetlands and land suitable for restoration as freshwater seasonal wetlands. Through their partnership, $600,000 in grants have been received from the North American Wetlands Council to restore wetlands, and a full-time wetland restoration manager is on staff to attend daily wetland maintenance.

The Wildlife Conservation Board, acting as the land acquisition arm of the California Dept. of Fish & Game (DFG), has provided over $2.1 million to protect high priority wildlife areas. The DFG now manages these properties to protect and restore their biological values to wildlife.

Sacramento County Parks used funds earmarked for habitat protection to acquire 600 acres of land within the Preserve, part of which will be restored with the remainder preserved for agriculture.

The Visitor Center.- The Visitor Center serves two primary functions; it is the on-site headquarters for Preserve's partner organizations, and it is the focal point for public access and education. The building is constructed in the "vernacular" style of a typical Delta barn, with the intention of blending unobtrusively into the natural and cultural landscape of the Preserve.

The building's functional design is driven by its two primary uses. The headquarters half of the building consists of 6 offices and a common work area to provide space for employees of the various partner organizations. These offices are accessible from a separate entrance, obscured from public view, located at the north end of the building. They can be closed off from the public space by doors and walls within the building.

A conference room, located roughly in the center of the building, is separated from the exhibit room by a movable partition wall. This flexibility allows the conference room and exhibit room to be combined and serve as a large public meeting room for audiovisual, business, public education and other types of programs requiring more space than the conference room alone can offer.

The southern half of the building is expressly for visitor use. It consists of the main entrance, a docent office/information window, a 368 square foot exhibit room with a high peaked ceiling. The exhibit room measures 16 feet wide by 23 feet long. There is one door for public entry and exit, and one small window on the wall opposite the entrance door. Ample ambient natural light fills the room from a skylight located in the ceiling and a roof-peak window. The skylight may be closed by a set of motorized louvers for audio-visual presentations or other programs that require darkness. A small docent office, with information window opening onto the deck outside the building facilitates the dissemination of information to people who do not wish to enter.

The Visitor Center's primary outdoor feature is a 868 square foot deck. This deck and its exhibits will be open to the public even when the indoor exhibit room is closed.

As part of its public programming role, the Visitor Center will also eventually function as the primary entrance to the Willow Slough Trail. This three mile long, self-guided nature trail features riparian forest and restoration, managed wetlands, the Cosumnes River, and valley oak savannah. In addition, access to the nature trail will also be available at the original trailhead located one-quarter mile north of the Visitor Center entrance. Access for canoes and kayakers will probably be provided from the Visitor Center location, at a put-in point into Willow Slough. From the deck, a bridge will cross Willow Slough to the nature trail. The entire Visitor Center and the bridge portion of the trailhead will be accessible to persons with disabilities.

Relationship of the Visitor Center With Other Regional Projects.- Stone Lake Education Center, a cooperative venture between Sacramento County Parks and Recreation and the U.S. Fish and Wildlife Service, has been formed at Stone Lakes Wildlife Preserve just south of Freeport and 15 miles from the Cosumnes River Preserve. The Stone Lake Cooperative Management area will border the Cosumnes.

As part of this partnership a 23,000 sq.ft. environmental education facility is proposed. This facility will have a 4550 sq.ft. auditorium for school groups, tour groups and community gatherings. The core of the visitor experience will be the unique 6,000 sq.ft. interpretive diorama sequence and wildlife viewing corridor. The Stone Lake Center will be the main center for interpretation in the Central Valley and the Sacramento Delta.

Interpretation at the Cosumnes Wildlife Preserve should compliment and support that presented at the Stone Lake Environmental Education Center, while demonstrating the uniqueness of the Cosumnes River Preserve. The Cosumnes River Preserve presents many unique environmental factors not found in the Stone Lakes area such as a free-flowing river that floods regularly each winter, oak riparian habitat, and a more open river system. Visitors should also understand the avian needs for seasonal movement between Stone Lakes and Cosumnes River Preserve.

Natural and Cultural History.- The Cosumnes River Preserve encompasses a portion of the alluvial plains of the Cosumnes and Mokelumne Rivers. Topography is relatively level. Although the land is moderately well-drained, it is subject to flooding during the rainy winter season. Under natural conditions, permanent and seasonal marsh and riparian forest would cover much of the Preserve. Most of the land is 5 to 15 feet above sea level, within tidal range, and below the 100 year floodplain. The importance of natural flooding to the ecology of the riparian forest is a key physical factor in the development of this habitat.

The surface lands are underlain by fluvial sand, silt and gravel deposits of the Pleistocene Riverbank Formation which overlies several thousand feet of Cenozoic and Cretaceous sediments of the Sacramento Basin. Certain locations on the Preserve present a high potential for development of natural gas deposits, and mineral rights have been reserved in some areas by previous owners of Preserve lands.

The Cosumnes is the largest undammed river in the Sierran/Central Valley area, with flows varying from several thousand cubic feet per second (cfs) during the winter storm season to essentially zero during the late summer in drier years. As recorded at McConnel (Highway 99), average annual flow is 526 cfs, and maximum recorded flow (pre-1986) was 54,000 cfs. Overall flows of over 1,000 cfs for the months of January through April result from winter rains and spring snowmelt.

Most of the lower Cosumnes is unconstrained by levee systems, since its flooding has not threatened urban areas and agriculture has adapted to (and to some extent depends on) the shallow, short duration, seasonal flooding of the alluvial plain. Agricultural lands within and surrounding the Preserve provide important habitat for wintering waterfowl, shorebirds and sandhill cranes. Agriculture as a "compatible human use" is also to be a primary theme in the Preserve's interpretive program.

Much of the Preserve is subject to regular flooding. The lower reaches of the Cosumnes River, within the Preserve, are effected by tidal action (although the water remains fresh) and water remains in the river at all times. As a consequence, water level responds to daily changes in the tide as well as seasonal changes in downstream flow.

The Cosumnes is one of the two most productive ground water rechargers in Sacramento County, contributing an estimated 17,000 acre-feet annually to the county's ground water supply. The ground water level in the vicinity of the river's mouth is immediately subsurface, but increased pumping has begun to result in steadily dropping levels in some nearby areas such as Elk Grove and Galt. Because the watershed is undeveloped, quality of surface water in the Cosumnes is very good, with high levels of oxygen and low levels of bacterial contamination. It is rated excellent in mineral quality for all purposes.

Wetlands.- Due to the undammed and relatively unconstrained nature of the river itself, the Cosumnes floodplain is closer to a natural state than any other in the Central Valley. Preservation of the natural hydrologic conditions has maintained a wetlands environment similar to that which existed throughout the Valley in times past. As agricultural and urban development have now all but obliterated this natural ecosystem, safeguarding the few remaining fragments is an urgent priority. Important types of wetland environments found in the project area include: Riparian Forest (Valley Oak and Mixed) along the sloughs and river; Riparian Shrub Thicket associated with freshwater tidal wetlands along the waterways; and Freshwater Marsh, both permanent and seasonal, on the alluvial plain. Examples of all of these communities may be viewed by the public from the Willow Slough trail.

Vegetation.- The riparian woodland is a structurally diverse vegetation type, which, in addition to the trees dominating the assemblage (Valley Oak, Fremont Cottonwood, Or-

egon Ash, Box Elder), also includes shrubs such as Elderberry, vines of wild grape, poison oak, brush and forbs. This diversity provides a range of wildlife habitats far surpassing that of the other vegetation zones. The Riparian Shrub Thicket is characterized by shrub-form button willow, four species of true willows, blackberry, wild rose, alder and occasional trees. Also of great value for the wildlife habitat provided, the Freshwater Marsh, supports a growth of tules, cattails, rushes, sedges, grasses, and other seed-bearing plants.

The single most significant plant species on the Preserve is the Valley Oak (*Quercus lobata*). These oaks were once widely distributed in the Valley, but their habitat has been largely destroyed by development, and even where stands of trees survive, reproduction has been curtailed. The lower Cosumnes supports the finest remaining example of Valley Oak forest and provides site conditions which promote vigorous natural regeneration.

Because of the fragmented nature of the riparian forest protected within the Preserve, The Nature Conservancy has embarked upon an ambitious plan to restore certain areas, previously cleared for agriculture, to create a continuous corridor of forest along the river. All of the major species of the riparian forest are being planted with the help of hundreds of volunteers from nearby metropolitan areas. Several riparian areas in various phases of restoration may be viewed from the Willow Slough Trail.

Critical wildlife habitat is provided by the Freshwater Marshes. The marshes and wetlands available in the Central Valley today for use by waterfowl, represent only from one to five percent of those present historically. Preventing further loss of this habitat is vital to the maintenance of Pacific Flyway waterfowl populations. For this reason, Ducks Unlimited is working toward a goal of restoring over 1,200 acres of the Preserve's freshwater seasonal and permanent wetlands as part of the Central Valley Joint Venture (CVJV). The CVJV is implementing high priority wetland restoration projects as part of the North American Waterfowl Management Plan. Managed seasonal wetlands may be viewed from the Willow Slough trail, as well as new trails (for foot and/or auto traffic) under consideration for construction in 1993 or 1994.

Other important habitats on the Preserve include valley oak savannah and remnant stands of native perennial grasses, such as *Leymus triticoides*, *Stipa pulchra*, and *Hordeum brachyantherum*.

Wildlife.- The area's rare combination of hydrologic factors, land use patterns, and vegetation types have created a situation extremely favorable to wetland-oriented wildlife. Waterfowl and shorebirds by the thousands are attracted to the area—with use especially heavy by migratory waterfowl during the winter and early spring flood season. The list of observed avian species numbers over 200, with some of the better-known migrants being Sandhill cranes, Ross' Whitefronted and Canada Geese, Tundra swans, and ducks such as Northern Pintail, Cinnamon and Green-Winged Teal, Northern Shoveler, and American Wigeon. Important resident birds include Great Blue and Green Herons, Wood Ducks, Black-crowned Night Herons, Great Egrets, and Swainson's, Red-Tailed, and Red Shouldered Hawks.

Familiar mammals reported on the Preserve include raccoon, otter, muskrat, mink, long-tailed weasel, skunk, and opossum. In addition, the Preserve supports a healthy herd of Columbian blacktailed deer. Complete lists of reported mammals, as well as amphibians and reptiles, are extensive. The occurrence of fish in the lower Cosumnes includes reports of about 50 species. Popular anadromous sportfish of the Preserve include striped bass, a small winter run of chinook salmon in non-drought years, and American shad. Catfish, bass, and sunfish are year-round residents.

The two animal species most critically dependent on the Cosumnes flood plain are the Greater and Lesser Sandhill cranes. These birds rely heavily on Central Valley wetlands during their winter migration, with over half of the Greater Sandhill cranes present in the Valley moving to the Preserve in mid-Winter. These birds are, as one might expect, a major attractant for visitors to the Preserve during the winter months. Any reduction in the area of seasonally-flooded land would have an immediate adverse effect.

Threatened and Endangered Species. Sensitive species in the vicinity are mostly associated with plant communities and habitats that have been disappearing from the

Central Valley as agriculture expands, urbanization increases, and natural drainage patterns are altered by damming and diverting river waters. The native communities are freshwater marsh and riparian forest communities.

Sensitive plants of marshes found on or around the Preserve include:
California hibiscus (*Hibiscus californicus*), and delta rule pea (*Lathyrus jepsonii*), both federal candidate species, category 2.

The only federally listed animal (threatened) found in the vicinity of the Preserve is the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). The beetle has been sighted along the Cosumnes River approximately 4 miles to the northwest of the project site. It spends its larval and pupal stages on and in elderberry plants often growing in riparian zones.

Three state listed animals are found on the Preserve. The giant garter snake (*Thamnophis couchii gigas*), (state listed threatened, federal candidate, category 2) has been observed on the Preserve.

Generally it is found in a variety of Central Valley wetland habitats with associated uplands for protection from floodwaters. Swainson's hawk (*Buteo swainsoni*), (state listed threatened) has been observed nesting on the Preserve. This raptor prefers to nest in open riparian woodlands and often exploits the rodent populations of agricultural fields, especially grain or hay crops after harvest.

Visitors to the Preserve should not expect to view most of the rare species cited above, with the exception of Swainson's hawks. Large kettles of Swainson's hawks (as many as 195 birds at one time) have been sighted during fall migration hunting disced fields that are being prepared for wetland restoration.

The greater sandhill crane (*Grus canadensis tabida*), (state listed threatened) is a winter resident at the Cosumnes River Preserve. It forages in areas of open freshwater marsh and agricultural fields. Sandhill cranes are easily visible to visitors from the trail and roads, as well as from various wildlife viewing points.

Two other sensitive bird species, the white faced ibis (*Plegadis chihi*), and the tricolored blackbird (*Agelaius tricolor*), (both federal candidates, category 2) have also been reported on the Cosumnes River Preserve. The ibis feeds in freshwater marsh and cultivated fields. The tricolored blackbird often uses emergent marsh vegetation, cattails and rules.

There may also be some incidental use of the general area by other listed raptors including peregrine falcon and bald eagle.

Cultural History.- Up to the time of European settlement, the watershed of the Cosumnes was densely populated by the Plains Miwok people, who resided in numerous large villages located on elevated landforms in the wetlands environment. This population density reflected the area's rich endowment of useful natural resources, particularly, abundant waterfowl, fish and acorns. Some archeological sites have been found on the Preserve.

The Native Americans were displaced by European emigrants beginning in the early 1800's. Settlement and agricultural development of the area began in the later 1800's, and this pattern of use has continued uninterrupted to the present day.

Diversity in Action, Nevada BLM and Florida A&M University

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The Historically Black College and Universities initiative is being undertaken to help the Bureau meet mission requirements and attain the workforce diversity necessary to achieve a quality, competitive organization in the future. Included are outreach efforts to bring qualified women and minorities into significant roles in the Bureau of Land Management through implementation of the Partnership in Progress concept between the BLM and institutions of higher education.

Nevada and the Bureau, are continuing program efforts to eliminate the under representation of minorities and women in professional, administrative, technical, clerical, and blue collar employment categories within the Bureau of Land Management.

While there are many colleges and universities that the Bureau works with, the steering committee established by the assistant director recommended six HBCU institutions for the program initiated in FY 1993.

To fulfill this initiative in part, the Nevada Bureau of Land Management, has established relations with Florida Agricultural and Mechanical University through the State Offices of Nevada, Eastern States, Alaska, and Denver Service Center. Nevada State Office has been designated lead State.

Nevada's responsibilities included establishment of a working relationship with the University to jointly ascertain, and develop opportunities beneficial to both.

Implementing a partnership between the Bureau of Land Management and Florida A&M University will include such actions as the employment of women and minority students under the Cooperative Education Program, the assignment of BLM subject matter specialists as adjunct teaching staff, provision of assistance in development of natural resources program curricula, increase emphasis on outreach and recruitment activities, inter-governmental Personnel Assignments, and the establishment of a wild horse and burro adoption facility.

An agreement between the Bureau of Land Management, United States Department of Interior and Florida Agricultural and Mechanical University, provides for assistance in construction and operation of a wild horse and

burro facility, and the definition of a strong partnership which promises many positive benefits to all involved.

Bureau personnel from Nevada continue to work with key faculty of Florida A&M University to identify curriculum , and create student awareness of opportunities to enter cooperative education agreements with the Bureau, for work in such fields as Automated Data Management, wildlife biology, engineering, cadastral survey, law enforcement, public affairs, and other applicable careers within the BLM.

Although the program has been in place for only two years significant accomplishments have been achieved. Specific milestones to date are summarized below:

Co-op Recruitment- Six FAMU students were recruited to perform work for BLM in Nevada's land survey, public affairs, veterinary science and administration programs. These students performed a variety of challenging work this past summer, and by all accounts their initial experiences went very well. Initiatives designed to promote a positive exposure included assuring that the students were given challenging, real world assignments; providing opportunities to enjoy the scenic and cultural attractions of Nevada; and, introducing them to key leaders of Reno's African-American community. Evaluation of the training has been reviewed and changes planned for the next work session.

"Adopt-A-Horse" Program- On September 11, 1993, BLM and FAMU held the second annual Tallahassee Wild Horse and Burro Adoption, and the construction of a wild horse facility located on the University Campus is scheduled for completion during the fall of 1994.

Job Fair- Charlie Robertson Deputy State Director Administration, Jim Currivan District Manager Battle Mountain, and Lenora Hollinger State recruiter, attended the job fair held at FAMU on September 21-22, 1993. Many students visited the booth and left copies of their resumes which were forwarded to the Bureau recruiter. A similar program is scheduled for 1994, which will be coordinated by Charlie Robertson who will be located in Tallahassee to work with the University over the course of the next two years.

Faculty Exchange- Dr. Pamea Hunter, a faculty member and veterinarian at FAMU completed a summer of work with the wild horse and burro program. She gained first hand knowledge of the capture, preparation, and care of wild horses. The training received will be useful in supporting the equine program at FAMU.

Curriculum Development- Dr. Bradford, Dean, College of Engineering Science, Technology and Agriculture, and Dr. Lawrence Carter, Administrator, Cooperative Extension Program at FAMU visited Nevada BLM on September 15-16, 1993. The primary purpose of the visit was to gather information, and see first hand what is required to support a wild horse operation. They toured the wild horse facility and observed branding, feeding, and other functions of the program. Curriculum development at FAMU was discussed and agreement reached to draft requirements and plan to promote equine science offerings.

These are but a few of the benefits expected in the coming years from the close working relationship between the Bureau of Land Management and Florida A&M University.

East Indian Basin—Striking A Balance

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Introduction-The Permian Basin in west Texas and southeastern New Mexico is well known for its abundance of oil and natural gas located in relatively shallow formations. Production has been fairly consistent over the years. The Roswell District's Carlsbad Resource Area (CRA) processes an average of between 300 to 500 oil and gas well applications for permit to drill (APDs) annually. However, production and exploration in this area often increase if the market place of oil and gas decline because it is cheaper to produce in the basin, due to the depth of the formations. In fiscal years 1992, and 1993, CRA processed about 800 APDs each year.

New oil and gas fields are rapidly developed in this area based on information gained from exploratory wells and improved geophysical technology. Minimal long-term planning occurs in this type of development scenario, which is compounded by the independent nature of most of the producers. As a result, most APDs and associated production facilities (rights-of-ways, pipelines, roads and powerlines) are filed individually. Thus, BLM must perform National Environmental Protection Act (NEPA) analysis on individual actions. In 1993, the CRA prepared about 1,300 Environmental Assessments, Categorical Exclusions or Administrative Determinations.

This type of analysis makes it difficult to consider cumulative impacts during the NEPA process. The lack of advanced development information perpetuates this situation.

Opportunity- In the late summer of 1993, BLM learned that several oil and gas companies were filing APDs, Sundry Notices, right-of-ways, etc., in a relatively undisturbed area about 20 miles northwest of Carlsbad, NM. Inquiries to the companies revealed that the subject area represented a new, potentially productive oil and gas field. The proposed development area is about 25,000 acres in size, featuring homogenous topography and wildlife habitat zones. Extensive development in this area could potentially result in long-term, cumulative impacts to valuable wildlife habitat, watersheds, visual resources, caves and cultural resources.

BLM envisioned an opportunity to minimize the cumulative impacts so that this relatively shortterm use (7 to 10) years) would have minimal long-term impacts to the public land

resources. To accomplish this, BLM proposed the preparation of a field-wide Environmental Assessment (EA) that would establish institutional controls through mitigative measures to promote sound management of the proposed development.

Process- To accomplish the goal of orderly development of the area, BLM involved Nearburg Production, Santa Fe Energy Corporation, Marathon Oil Company and Yates Petroleum Corporation in the planning and drafting of the EA. To further that end, the following steps were taken:

1. All surface disturbing authorizations in the study area were postponed pending the completion of the EA.

2. The four companies submitted a joint plan of development for the entire study area.

3. An interdisciplinary team was established and charged with considering impacts to all of the ecological components of the study area.

Coordination meetings between the companies and BLM management identified significant resource concerns; identified opportunities for shared facilities such as common R/W corridors; clarified management parameters to mitigate potential environmental conflicts prior to submission of company development plans; and clarified timeframes and responsibilities of the organizations involved.

BLM drafted the EA with the full participation and cooperation of each of the companies. From the EA a uniform set of development rules were generated with full participation from the companies. These mitigative measures will be attached as stipulations to all surface use authorizations.

In addition, the companies proposed and BLM adopted the establishment of a mitigation funding pool as a source for funding special mitigative measures and as a basis for considering the cumulative and indirect impacts to cultural resources.

Benefits- "Promoting collaborative leadership" - The partnerships developed between BLM and the companies have established a relationship of cooperation - not confrontation. The partnerships are based on responsiveness to meeting time commitments and concerns of the companies. This has set the tone for the mutual resolution of future issues. The four companies received the State Director's Group Award for their environmental concerns at BLM New Mexico's annual Oil and Gas Conference.

"Serving current and future publics" - A precedent has been established that encourages the value of partnerships. This will promote and encourage similar opportunities in the future which will contribute to good customer service.

"Maintaining Healthy Ecosystems" - This was the primary goal driving this process. BLM and the companies learned that with cooperation and advanced planning extensive oil and gas development could be balanced against the health of the ecosystem. It has also provided an incentives for both BLM and industry for future collaborative efforts.

"Improving the way we do business" - This EA is the first time a major new development will be managed allowing for the mitigation of long-term cumulative impacts. It has set the stage for similar actions in the future because BLM delivered on its commitment. BLM said from the beginning that we needed to "go slow to go fast" - if the companies would cooperate at the beginning of this process, it would streamline the processing of their needs in the future. This is currently happening as APDs right-of-ways and other permits are now being processed in about two weeks. BLM now has a realistic model to serve as a precedent to move towards the goal of balancing oil and gas development with maintaining healthy ecosystems.

The establishment of a Mitigation Trust Fund for special mitigation is also unparalleled and precedent setting. It will give BLM the ability to fund projects for a variety of resource needs. It also establishes a framework for the treatment of indirect and cumulative impacts to cultural resources.

Establishing A Regional Vision

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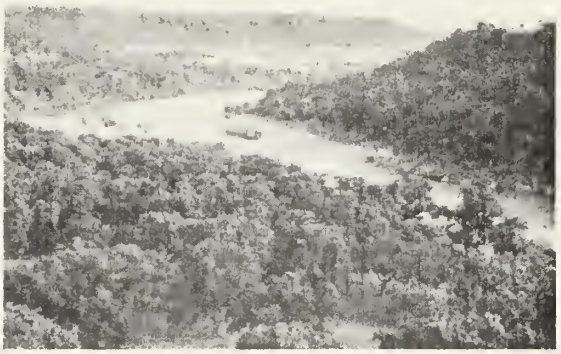
On July 27, 1993 Ed Hastey, California State Director, approved the Redding Resource Management Plan and Record of Decision. This approval culminated a four-year effort of collaboration with the public in developing a regional vision for the long-term stewardship of public lands administered by BLM within the north-central portion of California. The regional vision for BLM, as captured in the RMP, represents an ambitious departure from past planning efforts but builds on some traditional strengths of BLM within the Redding Resource Area.



Sacramento River area.

In The Beginning- In 1989 BLM had an existing land use plan which provided minimal direction for the Redding Resource Area. Moreover, the public had not been meaningfully involved in developing the plan. The result was a land plan assembled by a multi-disciplinary team which reflected individual resource specialists desires while providing maximum managerial discretion. Without a clear common focus, BLM staff had to react equally to all requests on all public lands. With more than 1,000 parcels scattered throughout north-central California, BLM's effectiveness was limited.

The Process- BLM established planning issues and developed land use management alternatives through an ongoing dialogue with the public. Public meetings attended by 15 to over 300 people were used to arrive at a draft document. Continual involvement of appropriate Federal, State and, particularly, local agencies helped assure that BLM was considering the entire planning area. BLM staff agreed to think in regional terms and, subsequently, consider public lands in that context. They were all encouraged to avoid "yellow fever", i.s. looking at a map of the area and only getting hot if lands were colored yellow (denoting current BLM administration).

The Result- The ultimate output of this process was an RMP which received only six individual protest letters and was, conversely, broadly supported by the public. BLM made hard choices where to focus human and fiscal resources in areas with outstanding public or natural resource values. Typically these areas centered around important rivers, streams, or wetlands which were accessible to the public. The remaining public lands were identified for disposal via exchange to help acquire private interests in these more important areas. By implementing the RMP,, BLM would change from custodial management on more than 1,000 individual parcels to affirmative management in about twenty geographic focus areas.

Implementing The Vision (Sacramento River Area)

As part of the RMP, resource objectives or goals were established for each geographic focus area. For the Bend Area of Critical Environmental Concern (commonly referred to as the Sacramento River Area), BLM established the following objectives in response to public input:

1. Protect existing and improve degraded riparian vegetation to Class I and II.
2. Enhance wetlands (and dependent species) habitats.
3. Conserve archaeological resources and provide research opportunities.
4. Enhance anadromous fisheries.
5. Ensure long-term survival of special status species.
6. Maintain and improve scenic quality.
7. Provide for semi-primitive recreation opportunities.

From a beginning with 1 mile of river frontage to 12+ miles in 1994, the public's resources have grown through land exchange and purchases with Land and Water Conservation Fund monies. The Sacramento River Area encompasses 40,000 acres in a 26-mile river corridor that includes Battle Creek, a major tributary. The plan offers the public the opportunity to secure access to this lush, predominantly natural river corridor which adjoins Interstate 5, the main north/south transportation artery for the entire west coast. Annually, I-5 carries over 11 million vehicles by Jellys Ferry Road, the major access point to the river.

Full of history, important to commerce, and rich with wildlife, the mighty Sacramento River is a ribbon into the past and a lifeline into our future. The Sacramento River Area offers an unsurpassed opportunity to secure these treasures now and for future generations. If action is not taken soon, the remaining large block ownerships will be developed, broken down into costly lots, and so be lost to the public forever.

The BLM has unanimous support from the Tehama County Board of Supervisors for this acquisition program. When acquisition and exchanges are completed as identified in the Resource Management Plan, Tehama County will have a net increase of 6,680 acres into the private sector and onto their tax roll.

"The river between Redding and Red Bluff contains most of the mature riparian woodland left in the State.

Big stands of Sycamores, Cottonwoods, Oaks and Willows secure the banks against erosion. They shade salmon spawning riffles and support extravagant populations of wild birds, mammals and reptiles."

San Francisco Chronicle, June 19, 1992

Environmental Setting- From the waters of the Sacramento River, to the tranquil vernal pools of the uplands; from the luxuriant riparian vegetation ribboning the flood terraces, to the blue oak studded woodlands scattering across rolling plains - the Sacramento River Area is truly exceptional. The project area is bound roughly to the north and south by the communities of Anderson and Red Bluff, and encompasses portions of the Battle Creek, Inks Creek and Paynes Creek drainages. The dominating topographic feature of the Area is Table Mountain, whose dramatic plateau is something to behold.

Of the approximately 40,000 acres within the Sacramento River Management Area (29,800 acres are private, 1,600 acres State, 8,700 acres Federal), about 90 percent remains in a pristine condition. BLM has been working to consolidate Federal ownership within this critical area for over 20 years so that citizens from around the nation can experience first hand the on-going legacy of this historic river.

Natural Resources- *Special Status.* The Area provides habitat for a variety of Special Status plant and animal species - three species in the wetlands (Orcuttia tenuis, Juncus leiospermus var. leiospermus, Gratiola het-

erosepala) and three in the uplands (Cryptantha crinita, Calycadenia fremontii, Paronychia ahartii). Swainson's Hawks and wintering Bald Eagles are found here along the Sacramento River and Battle Creek whose waters also provide habitat for the Federally listed endangered winter-run Chinook salmon. The threatened Valley elderberry long-horned beetle is a frequent resident of the mature elderberry thickets adjacent to the River.

Wetlands. Presently there are 80 acres of wetlands and 60 acres of nesting habitat for waterfowl and shore birds on the lands acquired to date. Construction of additional wetlands is scheduled pending new funding.

Wild & Scenic- Under the 1993 Redding Resource Management Plan, BLM found segments of the Sacramento River, Battle Creek and Paynes Creek eligible for the National Wild and Scenic Rivers System. Eligibility determinations of the Sacramento River and Battle Creek were strongly supported by the public organizations and agencies through their comments on the Draft Management Plan.

Cultural Resources- The Area has more than ten significant Native American archaeological sites per square mile making it one of the most important cultural resource zones in California. The valley and uplands provided rich food sources for the Nomlaki and Southern Yana Indians. The quality and size of their ancestral village sites along the River are greater than any administered by a public entity in the State. The Area hosts significant historic sites as well, among them remnants of the Blue Ridge Flume which was constructed from the Manton area to Red Bluff by way of Inks Creek. This 42 mile flume was used in the 1870's to transport milled lumber to the Company's factories, which together formed the most complex lumber operation in the world at the time. Wood products were then transported to rail to locations throughout California and beyond.

Recreational Resources- Year round recreational use of the Area has been rapidly increasing in concert with public land acquisitions. Floating the River is popular during the hot summer months, while hunting, horseback riding, and sightseeing tend to be more popular during the cooler months. Fishing occurs throughout the year, with the highest concentrations of anglers on the river during the salmon and steelhead runs. Many anglers claim these waters offer a world class trout fishery. In any case, their tourist dollars are a significant contribution to the communities along the corridor who derive an average of $275 (Fuel, meals, hotels, rentals, guides, etc.) for each salmon caught.

Innovative Partnerships- BLM has developed innovative cooperative management agreements to facilitate land management within the Area resulting in cost savings, improved public access, and major habitat protection.

In 1987, BLM entered into a cooperative agreement with the Santa Clara Unified School District to facilitate the construction and maintenance of various trails and facilities within the area. Santa Clara USD also uses the Area for summer environmental programs and is developing interpretive materials covering the flora, fauna, and cultural resources. Cooperative agreements completed with California State University, Chico, and Shasta College have been integral to the conservation and inventory of important cultural sites. BLM has worked with the California State Land Commission to develop an agreement to give BLM management responsibility over two State owned islands whose extensive public use was uncontrolled but is now supervised. Recreational use in the Area is now regularly monitored by BLM's uniformed visitor services staff and Tehama County has expressed a desire for BLM to manage their County boat ramp and day-use area located adjacent to the Bend Bridge.

Orientation/information displays and portal signs have been provided in part by a grant from the El Paso Natural Gas Company. A wheelchair accessible fishing platform and dock will be completed in 1993 with substantial labor donated from the Pacific Gas and Electric Company the Private Industry Council.

Fisheries projects have been completed, such as the construction of spawning riffles in 1988 in cooperation with the California Department of Fish and Game. Riparian areas have been fenced to protect them from grazing and existing ponds have been repaired and enlarged. Wetland enhancement projects, using funds contributed from the California Wildlife Conservation Board, are on-going near Paynes Creek.

BLM has taken a leadership role in working cooperatively with all players involved. This team approach recognizes the shared benefits of the RMP. Local government has more land returned to their tax base. Ranchers grazing rights are preserved while protecting critical habitat. Wildlife areas are enhanced, enlarged and created which satisfies resource agencies and environmental concerns. And the public's recreation avenues are expanded.

Award Winning Performance- In June of 1992, the Sacramento River Preservation Trust presented the Redding Resource Area with the David Bobb award for BLM's efforts in protecting the natural values of the Sacramento River.

Acquisition- Leveraging Limited Resources included the 1993 House Budget $1,000,000 for additional acquisition within the Area. The Redding Resource Area BLM intends to use its Land and Water Conservation (L&WCF) allocation to cover purchases and expenses of processing exchanges. In this manner, BLM can maximize the use of limited monies for acquisition and, where possible, expand or keep equivalent acreage within local governments' tax base.

Five land owners control 75 percent of the remaining private land to be acquired along the river. Some parcels of land have been acquired via exchange and purchase with (L&WCF) funds. In 1992, BLM successfully acquired 14,500 feet of critical river frontage along the Sacramento River. The number one priority for acquisition is the Table Mountain property. This would give BLM ownership of both sides of the River and would provide protection for a large vernal pool located in the heart of the parcel.

The Sacramento River Activity Management Plan and the Redding Resource Management Plan lay out specific acquisition, development and management objectives for the Area. Taken together, they will enhance recreational opportunities and improve management of the wetland and riparian complexes while expanding Tehama County's tax base.

"A few miles from Battle Creek, we come to the mouth of Inks Creek, where oaks form a dense canopy over the water. We penetrate far up this tributary, which has about it the distinct feel of a Louisiana bayou. The water is warm, and wild grapevines festoon the overhanging branches.

Our paddling irritates a huge conclave of belted kingfishers. They fly ahead of us, screeching. California ground squirrels and yellow-billed magpies likewise voice their displeasure at our exploration. We leave them in peace after coming to an impassable shallow riffle and paddle back to the main river.

We camp that night on a sandbar marked by a single cottonwood tree. A bald eagle surveys us from its branches as we approach, then departs with unhurried wing beats.

After dinner, we hike to the top of an adjacent bluff, where the river and its attending lands are spread out before us. From this vantage, we can see miles in every direction. The only visible signs of civilization are a faraway radio tower and some irrigation pipe in a distant field. Below us, we spy deer, and osprey and mergansers, the toothed fish-eating ducks that inhabit the State's wild rivers.

I've rafted or canoed over 50 wild rivers in Canada and the United States and I've never seen wildlife concentrations like I see on this part of the Sacramento River. Look around. A hundred years ago, the view would've been the same."

"There's no place like this on earth."

San Francisco Chronicle, June 19, 1992

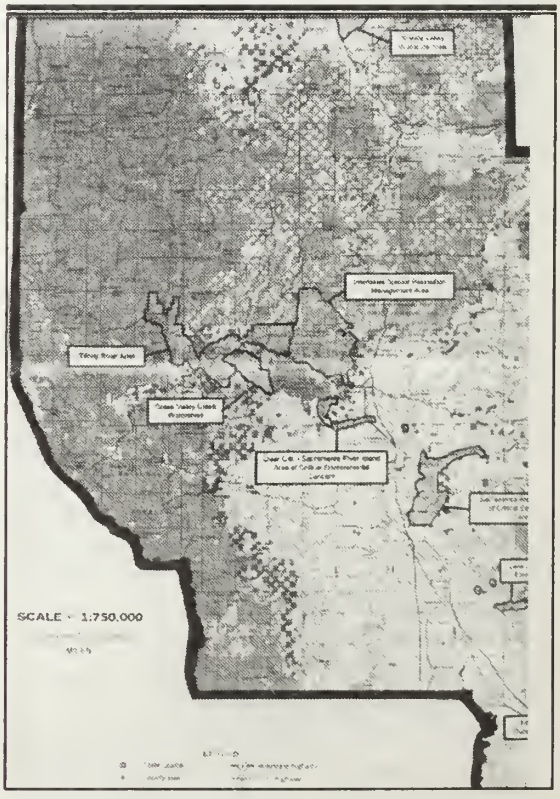


Figure 1. Location Map

Ecosystem Management Case Studies Utilizing Data From Remote Automatic Weather Stations (RAWS) And Remote Environmental Monitoring Systems (REMS)

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RAWS Network Overview- The current BLM RAWS Network was originally proposed and placed as a fire management requirement. The need for near real-time meteorological data from the remote interior of the west was the primary driving force. The sensor compliment, scan rate, sampling method, station placement, and functional use were selected to satisfy fire management requirements. However, the flexibility that was built into the network has provided additional capabilities for other resource management functions within the BLM and other agencies as well. These additional capabilities have provided users with a wide spectrum of Remote Environmental Monitoring System (REMS) Capabilities.

Study #1 Applications In The Biological Control Of Leafy Spurge

I. Noxious Weed Overview

Most noxious weeds are non-native that were accidently brought into this country from other parts of the world. They rapidly spread and have displaced other plant species. Noxious weeds are a widespread problem throughout the western United States. Researchers from the North Dakota State University estimated that direct and indirect impacts from leafy spurge have cost over $110 million dollars in the northern Great Plains in 1990. Further, negative impacts from noxious weeds include: loss of wildlife habitat; reduced cropland and farm production;reduced livestock grazing capacity; and diminished water quality and fish habitat. Additionally, leafy spurge plants contain a latex that, if rubbed on the face, can cause a rash or blindness around the mouth and eyes.

Several methods are currently being used in an attempt to reduce the spread of noxious weeds. These methods include chemical spraying, sheep and goat grazing in leafy spurge areas, and the introduction of biological control agents. These agents include insects such as hawk moths, flys, and flea beetles.

II. Noxious Weed Control Methods

Listed below are some controls used for noxious weed management.

A. Chemicals -

These involve dollars for the purchase of them and equipment, as well as for training. Additionally, chemicals do raise environment concerns. However, they do have there place and use, especially for isolated infestations too small for biological control or to treat around the perimeter of a larger infestation to prevent further spread.

B. Mechanical -

This control is usually for a small area only. It can also be the cause of spread of an undesirable plant. It should be noted that unless a good revegetation program is planned and completed the noxious weeds become established much easier in disturbed soils.

C. Biological -

1. Sheep and Goats- Often requires change in management business style. Must be very observant on a daily basis as to levels of utilization of both the target weed and desirable plant species. Requires a herder and/or a watch dog to prevent predation. This method provides income rather than just spend money on control. Get a return from the land rather than an expense. Proper management often results in an increase of desired plant species.

2. Insects or Pathogens - These are the natural enemies of the exotic plants. They are native of the country from which the exotic plants are of origin. Must realize that this method of control can be very slow. Might take up to 15 to 20 years before the exotic plant is brought down to an economic control level. Also in many situations, a complex of six to nine biological control agents is needed in order to accomplish an economic control level.

3. Prevention, Early Detection, and Eradication of Early Detected Noxious Weed Species - This method is the most practical and economical means of weed management. Prevention is best accomplished by ensuring that new weed species' seed or vegetative reproductive plant parts are not introduced into an area.

III. Evaluation of Resources

A. Cooperating Agencies -

1. ARS-Research: Insect and disease control experts in collection, clearance, etc. They know the weed, and have access to the insects.

2. BLM: In some cases has underutilized RAWS equipment and data, attempts to make best use of limited Range Improvement money, and also has weeds to control.

3. County: Weed Control Boards or Associations; local knowledge, equipment, people, and they **have alot of weeds**. They may want to do too much too soon.

4. Local land owners: Provides for peer pressure, easement on research land.

5. High School: Future land managers and taxpayers. Potentially could play future key role.

6 Insects or Pathogens: Must be specific to plant (root, stem, flower, etc. Must be adapted to the site's climate and can be complete life cycle in a specified time at the site. Insects (most) spend 85% or greater of their life cycle in the surface 2" of the soil. Pathogens usually are very dependent upon soil moisture or above ground humidity. We have identified two items that we can "key" on. Climate is one (soil properties are a good indicator of long term climate regime), the other is insect specific physical and/or chemical properties of the soil surface.

IV. Fishtail Site

The Fishtail REMS located in Stillwater County, Montana is a perfect example of the ability of REMS to use a wide spectrum of data collection capabilities to allow resource managers to make better decisions. It was installed on October 19, 1992. The BLM, working with local, state, and other federal agencies is attempting to understand various MET and soil conditions and their effects on the success or failure of biological weed control agents. Further, it is hoped that this undertaking will help in the reduction of noxious weeds.

The system is collecting meteorological (MET) data including rain, wind speed/direction (average & peak gusts), air/fuel temperature, and relative humidity. Additional data is collected for soil moisture and soil temperature. The sensors sample data on an hourly basis and then transmit the data every three hours through the GOES satellite.

The Fishtail REMS is also configured to store collected data "on-site" in a "RAM" module. This module provides the REMS with a datalogging capability, allowing the user to retrieve data periodically, or for a specific event. Once retrieval of the data is complete, the user can use an assortment of programs to manipulate the data. In the case of Fishtail, USDA researchers can compare soil moisture/temperature data to help evaluate effectiveness of biological control agents that are attacking the leafy spurge root structure.

Additionally, the Stillwater County Weed Control Office felt that it was important to educate the local youth on the severe impacts that noxious weeds play on the region's overall economy. Based upon this, the BLM provided on-site training to a high school agriculture sciences teacher on the procedure to retrieve RAM data. The teacher, in turn, has used this for various projects and lessons within the classroom. Local high school students are also using RAWS generated data for Physics and Statistics. The use of computers and high-tech equipment prepares them for the future.

V. Summary

While not perfect, this has been a big step forward in bringing various cooperators together to select sites for insect release to control noxious weed. This allows all involved to obtain the most out of their money, equipment, and time.

Based on soil properties to indicate distribution of climate, five biological control agents were released at the site. The data from the RAWS station and the success of 3 of the insects at this site is valuable information.

It appears that we can release 3 of the 5 insects at locations that have the characteristics of Absarokee clay loam. This information is now being shared by all of the cooperators, and will be an influence on the future selection of sites and the insects to be released at a site.

This effort combines all levels of government with the local people to help them control the spread of noxious weeds, but more importantly, "being an integral part of the "TEAM".

The BLM and other agencies involved with Fishtail has learned a great deal from this project. It has answered some questions, yet, at the same time has raised others.

Overall, we were able to:

1. Identify the weather and climate components of the issue
2. Determine which data were needed for the project
3. Determine what data were available for project
4. Determine that the data are usable
5. Analyze data collected
6. Reach some conclusions

Additionally, the BLM's Montana State Office is using the soil moisture data generated from all the RAWS sites to enforce a Drought Management Policy on our allotments and to work with the State of Montana on its effort at Drought Management.

Study #2 Geothermal/Hydrological Monitoring Of Borax Lake

I. Borax Lake Background

Borax Lake is a large hot spring pool 800 feet in diameter covering about 10 acres. The hot spring has formed a large mound about 2500 feet in diameter which rises about 25 feet above the valley floor. The lake is shallow and averages about 2.5 feet deep except for the main "vent" area, which is a circular feature about 125 feet in diameter. The vent is located in the southwestern portion of the lake.

The lake has known surface water temperature ranging from 60 to 100 degrees Fahrenheit (F). The lake is the only known habitat for the Borax Lake Chub, a Federally listed endangered species. Concerns about geothermal development led to lease stipulations requiring monitoring of Borax Lake. As part of its lease stipulations, Anadarko began monitoring the lake's temperature with thermographs. A fish kill in mid-July, 1987 increased

concerns about the chub's sensitivity to thermal effects of Borax Lake. A 150 acre parcel surrounding the lake is privately owned. The Nature Conservancy has a lease on the private land and has stated its desire to purchase the land.

During the fall of 1989, the Anadarko Production Company drilled an exploratory hole for geothermal energy on its federal lease within the Alford Known Geothermal Resource Area. The drill hole is located about 1 mile southwest of Borax Lake. The small diameter hole was drilled to a depth of 1479 feet. A 22 hour flow test was conducted, during which time, it produced geothermal waters at an average rate of 320 gallons per minute and a wellhead temperature of 305 degrees F.

II. Installation Of The Borax Lake RAWS

During early 1990, it became evident in reviewing the monitoring data collected by Anadarko that the ecosystem was more complex than had been assumed. A BLM Class III RAWS was installed on July 10, 1990 by BLM/NIFC at the southeastern end of Borax Lake (see attached photo). The RAWS was configured to record rain fall, air temperature, wind speed/direction (averaged and gusts), and relative humidity. The data was collected hourly and transmitted by via satellite every 3 hours to the NIFC.

Since the initial installation, enhancements to the RAWS has been made. These include the establishment of a deep water temperature sensor (August, 1990). On March 3, 1991, the Borax Lake RAWS was upgraded to Class II unit with additional sensing capability that included the following:

Water Temperature Probes (both shallow and deep)
Water Depth Probes (pressure transducers, shallow and deep)
Solar Radiation
Barometric Pressure
Water Quality Sensor
(sensor monitors temperature, Ph, conductivity, and salinity)

The unit was also upgraded with an onsite "datalogger" allowing the user to download 3 to 4 months of data into a laptop PC. Currently, the BLM is in the process of upgrading user accessibility with the Automated Storage, Conversion, and Distribution System (ASCADS).

III. Borax Lake: Analysis Of Information

Since the introduction of the remote monitoring of Borax Lake, many questions have been raised. Some could be answered, while others not. One should look at the overall ecosystem of Borax Lake in order to find many of the answers.

The primary purpose of the Bureau's Mineral Program involvement on monitoring of Borax Lake and it's associated hot springs is to establish a basis to determine if geothermal operations from the Federal leases are effecting the Borax Chub or its critical habitat and to take appropriate and timely action to eliminate the effect if so determined.

By careful design, monitoring can quantify specific physical qualities of a system such as Borax Lake. To establish that the system has changed and that the change is due to geothermal exploration and/or development requires a process of analyzing the monitoring data based on a "concept" of what is normal. Upon recognizing a significant change in the system, the analytical process should be capable of discriminating between possible causes of the anomalous data. To take appropriate action assumes that there is a parallel process to determine what implications the detected change may have on the Borax Chub or it's habitat.

A considerable amount of data has been collected. Analysis of this data for monitoring purposes is not complete and is being actively pursued by several groups including BLM, FWS, BPA, Portland State University, Anadarko, and the Nature Conservancy. As data collection and analysis have progressed, the original simplistic assumptions about the Borax Lake system have evolved into much more complex set of hypotheses. The evolution is expected to continue to grow as data is analyzed/reanalyzed, new hypotheses are developed and tested, and theories and conclusions are substantiated.

A Field Office's Experience in Improving Production of Mining Claim Decisions

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Background- California, like most Bureau offices, has relied on an ad hoc set of procedures for developing automated systems, often not integrated with the needs of customers. There are advantages in adopting a methodology, at once standardized in terms of approach and at the same time customizable to fit individual needs. Operational processes tend to be based on traditional ways of work and, are seldom rethought, and have become encrusted over the years with steps which may no longer be practical or add value. Taken together, we have developed automated systems in nonstandard ways, and these systems have merely made old procedures go faster, not better.

An area of "pain" was identified and selected as a test bed for the new development methodology. The Mining Claims Recordation Unit has struggled for several years under a large and intractable backlog of approximately 65,000 abandoned and void mining claims. Efforts to reduce this backlog using traditional methods and with available staffing have been unsuccessful. Work processes in the Mining Claim Unit were typical of Bureau adjudication. They emphasized a careful, case-by-case approach incorporating multiple levels of review; compartmentalization of function among several organizational units; traditional approaches to format, filing, correspondence, and legal service; and automated systems which had been confined to individual component processes.

Methodology- Developing the Methodology was a bootstrap operation. Since none on the market emphasized reengineering, we determined to develop our own. Our requirements for a Methodology included:

- A Project approach that incorporated the nascent BLM AIM procedures, including a Statement of Need, a Charter, Sponsor, and a Project Team.
- Emphasis on the requirements and satisfaction of the customer.
- Recognition that the customer did not necessarily know what they needed or wanted and that a structured, collaborative effort between the Project Team and the customer was necessary to develop requirements. The analytical process consumed a healthy portion of the entire effort.
- Focus any automation effort toward the Modernization platform. To this end we

used an Oracle relational database, client-server networked architecture, Computer AIded Software Engineering (CASE) tools, and a Graphical User Interface (GUI). This is the Target system architecture and may allow us to add future capabilities not contemplated by IOC.

- Adherence to structured analytical methods.
- A Business Event approach crossing organizational and functional boundaries.

Analysis- The work processes in the Mining Claim Unit were described and documented in detail. The objective was to achieve a common understanding of terminology and process as well as to build a relationship of trust, communication, and respect among analysts and users. Once processes were fully understood, we distilled the essential logical business requirements. Our goal was to identify only essential processes stripped of implementation and design. Here, we were not interested in **how** things were done, but simply in **what** needed to be done. This is a difficult psychological step, particularly for those conditioned to think of their jobs strictly in terms of rules, handbooks, and forms, and was the key to any success we would have later.

With a common, documented understanding of the essential business requirements, brainstorming sessions brought out new ideas and approaches to old problems. No design, form, rule, process, organization, or tradition was respected unless it could be demonstrated to add value or was legally insurmountable. New business rules were formulated and documented, gaining buy-in and consensus by the Project Team, staff, and management at all levels. This was an electrifying process—the first time that staff and managers had brought together their collective experience and talents to bear on a complex problem and rethink it from bottom to top.

Design- We identified the goal to automate much of the process in a single, integrated, multi-user system. The system would take claim and claimant data from the existing Mining Claim Recordation System (MCRS); provide update screens for adjudicators; produce decisions and distribution lists, and mailing labels; track legal service; and close cases.

Implementation- The application went online in April, 1994. Currently there are two printers and four Macintosh client workstations—operated by three adjudicators and a clerk—running a customized Fourth Dimension front end. The clients are connected over an AppleTalk network to a Macintosh IIci server running SQL Oracle.

Processes- The steps, who does them, and the time in minutes to process an average case file (6claims, three claimants, and two addresses) are summarized in Table 1. It is difficult to precisely compare and quantify the activities in the old system versus the new. The new system has specialized reports and automates sorting, comparing, collating, and maintaining data to ensure that all required decisions are sent and served. Decisions are maintained in digital format online, available to answer telephone queries. Case files are handled only once, and for a very short time, by adjudicators. The availability of claimant data online reduces input errors. Altogether the new system is not only significantly faster but produces a higher quality product.

Following are jobs as performed under the old system and in the new systems.

- **Identify Case/Prepare Docket Charge Card**

Old: a printout of Abandoned and Void cases from (MCRS) is scanned for cases, files are selected one-by-one, and a charge card is filled out.

New: the entire database is online and a button produces a listing of a specified number of case files. A print command produces docket charge cards in batch.

- **Pull File**

Both: processes are identical in the old and new systems.

- **Adjudicate**

Old: adjudicator determines the parties to be served and their most current address by examining the case file.

New: claimant names and addresses are online. The adjudicator can refer to the newest addresses from the database rather than relying solely on the case file.

- **Prepare Cert Card**

Old: the adjudicator uses a green Cert card for every mailing. The claimant name and address, claim number, case type, adjudicator, are manually entered on the card.

New: instead of a Cert card for the first mailing, use a Business Return Service Postcard. The cost of a Cert Card is $2.29

versus $0.59 for a Service Postcard. We note that the Solicitor is raising concerns about the legality of using the Postcard.

• **Prepare Decision**

Old: name and address information is entered at least twice, and three different applications are used to produce the paperwork for a decision.

New: a clerk starts a fully automated process which determines the necessary mailings and creates appropriate decisions and distribution lists automatically.

• **Print Decision**

Old: printing is monitored and executed for each type of paperwork—decision, distribution, and mailing label.

New: a print command produces hard copy of all decisions, distribution lists, and mailing labels.

• **Xerox Decision**

Old: case file and reading copies of decisions are xeroxed for filing.

New: in-process decisions are kept in binary format in the automated system until the case is closed. Only the mailed decisions and accompanying paperwork are printed.

• **Prepare Mailing**

Old: Cert Cards and multiple copies of documents are prepared for review and signature. A suspense file of mailings is started.

New: The new system requires folding and stuffing. All suspense data is created and maintained in the system automatically.

• **Update MCRS**

Both: both systems update MCRS to reflect mailing a decision.

Management Review

Old: the case file is routed to a supervisor for review and signature of each decision.

New: no management review; a digital signature is printed on the decision.

• **Mail Log for Outgoing**

Old: Mail Room maintains an automated log of all Certified Mailings, requiring redundant entry of name and address and other data.

New: all service is tracked in the system automatically. Mail Room no longer tracks service from the Mining Claim Unit.

• **Log Incoming Service**

Old: as Cert cards are returned in the mail, they are logged into the Mail Room's automated system. Printouts are produced periodically for adjudicators. Tracers are executed for Certs not returned.

New: an optimized input of returned Service Postcards. Tracers are never initiated.

• **File Cert Card in Case File**

Old: returned Cert cards are filed in the proper case files as they are received.

New: Service Postcards are not filed in case files, unless there is an appeal, but are put unsorted in a chronological file by receipt date.

• **Determine Service**

Old: adjudicator consults a paper suspense file and calls up the case file to check that all Cert Cards have been returned. Adjudicator initiates an appeal suspense.

New: the system automatically determines service and starts the appeal period.

• **Close Case**

Old: when appeal periods have all run, notations are manually entered on the case file copy of the decision and on the case file jacket, closing the case.

New: a closing decision, accompanied by a printout of affected cases for the case file, is automatically created and sent to docket for filing and case closure.

• **Update MCRS**

Both: MCRS is updated to reflect that the cases are closed.

Comparison of old and new procedures to process a single case file

Comparison of old and new procedures to process a single case file

JOB	Old Job	Who	Time Min.	New Job	Who	Time Min.	
Identify case	Manual	A	1	Automated	A		
Prepare Docket Charge Card	Manual	A	1	Automated	A		
Pull File	Manual	D	1	Manual	C	1	
Adjudicate	Manual	A	10	Part Automated	A	8	
Prepare Cert Card	Manual	A	3	—			
Prepare Decision	Manual	A	16	Automated	A		
Print Decision	Manual	C	3	Automated	C		
Xerox Decision	Manual	C	1	—			
Prepare Mailing	Manual	C	2	Manual	C	1	
Update MCRS	Manual	C	1	Manual	C	1	
Management Review	Manual	M	1	—			
Mail Log for Outgoing	Manual	C	2	Automated			
Log Incoming Service	Manual	C	2	Manual	C	1	
File Cert Card in Case File	Manual	D	3	—			
Determine Service	Manual	A	6	Automated			
Determine Appeal	Manual	A	2	Automated			
Close Case	Manual	C	3	Part Automated	C	2	
Update MCRS	Manual	C	1	Manual	C	1	
A = Adjudicator		A	39		A	8	
D = Docket		D	4		D	1	
C = Clerical		C	15		C	6	
M = Manager		M	1		M	0	
		Total	**59**		**Total**	**15**	

— = Job not done

In situations where a job is required but no time is indicated, it is usually an automated process which is run in batch mode.

Total Case Backlog	65,000
Total Case Files Backlog	10,000
Claims per File	6.5
Claimants per File	3
Claimants per Address	2
Decision Mailing Backlog	15,000

Fire Rehabilitation of Burned High Desert and Foothill Plant Communities in South Central Idaho

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Introduction- In August 1992, wild fires consumed almost 85,000 hectares (ha) of sagebrush-steppe, high desert plant communities in the Shoshone District Bureau of Land Management of south central Idaho. The fires were unusually intense, occurred at a time when meteorological and environmental conditions were most vulnerable to fire and resulted in 50 to near 100 percent mortality of indigenous plants in many locations. These events followed a six-year period of severe drought. The composition of the areas burned ranged from low elevation sites heavily invaded by exotic annual species to mountain shrub communities dominated by remnant populations of native species. Whitlock (1985) has estimated that 70 percent of Idaho's fires are now anthropogenic or man-caused. Winward (1985) has observed that native plant communities in this region evolved in an environment that included wild fire intervals of 32 to 70 years. Such indigenous communities, however, included perennial bunchgrasses which constituted a widely spaced, discontinuous fuelbed that did not readily sustain wild fire (Pellant 1989). The most significant factors affecting and altering that equilibrium were associated with the settlement and agricultural development of the Snake River Plains, fire suppression and the introduction of domestic livestock in the 19th century. Pellant and Hall (1992) have estimated that 2.9 million acres of rangeland in the Great Basin are currently dominated by cheatgrass and another 75.7 million acres are classified as infested or susceptible to infestation.

Widespread historic heavy grazing of native plant communities and the concurrent invasion and expansion of alien annual species, particularly the ubiquitous cheatgrass *(Bromus tectorum)*, has been well documented (Piemesel 1951). Undisturbed stands of cheatgrass may contain an average of 570 plants per square foot (Hull and Stewart 1948). This species draws heavily on winter and spring moisture, depleting soil moisture to a level that is inadequate to sustain slower growing perennial grass seedlings (Robertson and Pearse 1945). Whisenant (1989) has reported that infestations of cheatgrass have increased fine fuel availability and fuelbed continuity so that large areas of the Snake River Plains now burn every three to five years. The same author estimates that 90 percent of the burned areas occurring in the Shoshone District in the last 30 years have burned on cheat-

grass-dominated areas. Resource managers recognize that effective strategies for fire rehabilitation can only be effective when the size and frequency of wild fires can be significantly reduced.

This paper addresses the rehabilitation efforts associated primarily with the Ro Fire, which occurred near Bellevue and Hailey, Idaho (10,135 ha). This fire received high levels of public concern and attention because of its proximity to concentrated residential areas, destruction of visual resources and the exposure of vulnerable slopes and watersheds to potential erosion. Planning for this intensive rehabilitation project required the involvement and partnership with a diverse constituency including state and federal agencies, ranchers and other public land users, conservation and environmental organizations, rural communities and other special interest groups.

Methods- Rehabilitation planning required the immediate mobilization of expertise for a wide spectrum of concerns. Considerations which impacted rehabilitation strategies and techniques included the following:

- The intensity of the fire caused high mortality of indigenous plants.
- The need to stabilize critical watersheds.
- Restoration of visual resources.
- Protection of water quality values in the Big Wood River and associated tributaries.
- The substantial costs of required and proposed techniques.
- Projected post-rehabilitation land uses including grazing and wildlife habitat.
- The adaptability and persistence of seeded species and their capacities to effectively compete with invading alien annual plants.
- Application of seed mixtures that would produce stands that resemble or mimic natural assemblages.
- Restoration of shrub components for wildlife habitat and structural diversity.
- Fire resistance of re-established plant communities.

Fire rehabilitation planning for the Ro Fire required the implementation of several separate but coordinated functions:

Erosion control structures- Control structures were installed in perennial or ephemeral streams and drainages on the east side of the fire. An additional 465 structures were installed in the fall of 1993. The structures were designed to provide short-term watershed protection from down-slope sediment movement until perennial vegetation could become established and provide long-term stabilization. Four basic types of structures were installed.

1. **Straw bale structures**. Straw bales were keyed into stream banks and across stream channels. They were anchored in place with steel fence posts.

2. **Wood and fabric structures**. Logs from burned aspen trees were laid across drainages and keyed into stream banks. Supac 4NP filtering fabric was draped over logs and keyed into stream banks on both upstream and downstream sides. These structures were also anchored with steel posts.

3. **Livestock panels**. Steel mesh livestock panels were keyed into stream drainages and stream banks. Supac 4NP filtering fabric was used to wrap these panels and steel posts were used as anchors.

4. **Rock dams**. Rock dams were hand placed to provide barriers in sidehill drainages.

Seed Mixtures- Three basic, diverse seed mixtures were proposed for site-specific application. Diverse mixtures provide a greater opportunity for successful reclamation because they provide a wider range of diversity to mimic indigenous plant communities, a broader nutritional variety for wildlife and livestock, different phenological patterns to prolong or extend the period when succulent growth is available, and mixtures or combinations of species to exploit a wide range of ecological conditions and form a more stable community that can more successfully resist invasion by undesirable plants.

Seeding Techniques- The methods used for applying seed on the Ro Fire were largely dictated by terrain and the intensity of the burn. Uplands that were intensively burned and accessible were seeded with a rangeland drill. Inaccessible areas intensively burned were aerial-seeded, as were riparian zones.

Mixture 2 was drill seeded with a rangeland

The following seed mixtures were used.

Common Name	Scientific Name	kg/ha	(lb/ac)
Mixture 1 - Aerial application on upland sites.			
Oahe intermediate wheatgrass	*Agropyron intermedium*	3.4	(3.0)
Luna pubescent wheatgrass	*Agropyron trichophorum*	2.2	(2.0)
Ephraim crested wheatgrass	*Agropyron cristatum*	2.2	(2.0)
Alkar tall wheatgrass	*Agropyron elongatum*	1.1	(1.0)
Paiute orchard grass	*Dactylis glomerata*	0.6	(0.5)
Apar Lewis flax	*Linum lewisii*	0.3	(0.25)
Delar small burnet	*Sanquisorba minor*	3.4	(3.0)
Eski sainfoin	*Onobrychis viciaefolia*	3.4	(3.0)
Mountain big sagebrush	*Artemisia tridentata*	2.2	(2.0)
Mixture 2 - Drill seeded on upland sites.			
Whitmar bluebunch wheatgrass	*Agropyron spicatum*	2.8	(2.5)
Luna pubescent wheatgrass	*Agropyron trichophorum*	1.1	(1.0)
Ephraim crested wheatgrass	*Agropyron cristatum*	1.1	(1.0)
Magnar basin wildrye	*Elymus cinereus*	0.3	(0.25)
Alkar tall wheatgrass	*Agropyron elongatum*	1.1	(1.0)
Paiute orchard grass	*Dactylis glomerata*	0.3	(0.25)
Apar Lewis flax	*Linum lewisii*	0.3	(0.25)
Delar small burnet	*Sanquisorba minor*	1.1	(1.0)
Eski sainfoin	*Onobrychis viciaefolia*	1.7	(1.5)
Mixture 3 - Aerial application on riparian sites			
Sodar streambank wheatgrass	*Agropyron riparium*	3.4	(3.0)
Luna pubescent wheatgrass	*Agropyron trichophorum*	4.5	(4.0)
Paiute orchard grass	*Dactylis glomerata*	0.3	(0.25)
Delar small burnet	*Sanquisorba minor*	1.1	(1.0)
Eski sainfoin	*Onobrychis viciaefolia*	1.7	(1.5)

drill on 160 ha (400 acres) at a rate of 9.80 kg/ha (8.75 lb/ac). Mixture 1 was aerial-seeded on steeper slopes after the first snowpack in December at a rate of 18.8 kg/ha (16.75 lb/ac). This treatment was accomplished with a whirlwind seeder mounted under a Hughes 500 helicopter and covered 1,450 ha (3,580 ac). Aerial seeding was also used to distribute Mixture 3 at a rate of 11.0 kg/ha (9.75 lb/ac) on riparian zones in Croesus, Colorado, Lee's and Dipper Gulches, West Fork of Rock Creek and Long Canyon (80 ha or 198 ac). In order to subsidize and enhance recovery of the shrub component, 21,000 containerized seedlings of antelope bitterbrush (*Purshia tridentata*) and mountain big sagebrush were hand planted in the spring and fall of 1993. Sagebrush seed was aerial-seeded on another 445 ha (1,100 ac) at a rate of 2.24 kg/ha (2 lb/ac).

Monitoring, Evaluation and Analysis of Treatment Success- In late summer 1993, data were collected on 11 randomly selected sites where rehabilitation treatments had occurred. These included three aerial-seeded riparian sites, three drill seeded upland sites, and five aerial-seeded upland sites. In the initial establishment year (1993), densities by species of planted grasses and forbs and surviving native grasses and shrubs were the parameters measured. Cheatgrass density was also measured. One transect was established at each of the 11 sites. Each transect contained 30 1-m^2 quadrats randomly placed. Other data, which are not reported here, were collected to measure live trees, dead shrubs and dead bunchgrasses.

Descriptive statistics were generated from the data collected using Version 6.03 of Sta-

tistical Analysis Software. Confidence intervals of 90% were established to indicate the variability of the data. For the purpose of this paper, means of density were calculated for all transects in each of the three seeding treatments. Densities by species of seeded grasses, seeded forbs, native perennial grasses and native shrubs within treatments were lumped to allow the analysis of the relative establishment/re-establishment of each of these components.

Success of erosion control structures was estimated through observation. The evaluation of containerized root stock of big sagebrush and antelope bitterbrush has not yet been completed.

Results And Discussion- The rehabilitation process described in this case history was designed to be a large-scale application of proven technologies, rather than an experimental procedure. Applied techniques have been tested in a multitude of controlled scientific tests. Nonetheless, the Ro Fire presented a unique opportunity to consolidate and use strategies that had previously received limited regional applications. One year after rehabilitation, some of the applications have clearly demonstrated their benefits and limitations. For example, even though the evaluation process has been observational in nature, the designed structures have clearly performed their intended function and have prevented channelization of streams and drainages from occurring. By the end of the 1993 growing season, approximately 70 percent of the erosion control structures had been breached, undercut or circumscribed. The highest incidence of failure occurred with straw bale structures. However, these were seen as programmed failures since they performed effectively as sediment traps and allowed establishment of perennial vegetative cover on previously bare soil.

A review of vegetative data indicates several apparent trends in the recovery of treated sites (Figure 1). Seeded grasses and forbs were most prolific on upland sites when they were drilled and surviving native grasses did not compete well at this stage of re-establishment. On upland sites where seeded species were aerially applied, surviving native grasses dominate while seeded grasses showed limited establishment. Currently, it is not known if surviving native grasses regenerated from surviving root crowns or germinated from indigenous seed sources. Surviving native grasses on aerial-seeded uplands are approximately as numerous as seeded grasses on drilled upland sites. This suggests that natural recovery of uplands may produce as many perennial plants as drilled sites. Riparian sites which were aerial-seeded exhibited slightly fewer surviving native grasses than aerial-seeded upland sites, presumably because of competition from indigenous grasses, sedges and resprouting woody species.

Figure 2 shows cheatgrass establishment and density on each of the three treatments. Numerical comparisons suggest that drilling may be highly effective in suppressing cheatgrass invasion on upland sites, at least in the initial establishment year. There is no significant difference in density between aerial-seeded upland and riparian sites. As shown in Figure 3, riparian sites indicate

Observations also suggest that site differences exert profound influences upon perennial community recovery. More mesic north-facing aspects indicated rapid re-establishment of perennial plants; more xeric south-facing slopes are dominated by early seral pioneer species or invaders. Site differences are associated with aspect, degree of slope, intensity of fire and preburn vegetative communities. Soils consist of highly erosive mineral components, with low water-holding capacity which amplifies the affects of site location on the landscape.

In this and future years, monitoring and evaluation studies will be expanded to consider other vegetative parameters on a species-specific basis. These measurements will allow a more detailed analysis of recovery dynamics, including increased opportunities for statistical comparisons.

Summary And Conclusions- The information presented indicates that erosion control techniques used on the Ro Fire were generally productive in stabilizing the watershed in the first year after the fire in intensively burned areas. The erosion control structures were highly effective in catching early sediment moving downslope and downstream. Even the straw structures, that showed the greatest failure in the first year following the fire, caught sediment on which perennial vegetation became established. These structures

Table 1. shows the density means (no. of plants/m^2) and confidence intervals of seeded grasses, seeded forbs, surviving native perennial grasses, surviving shrubs and invading cheatgrass for each of the three treatments.

Seeding Treatment	Seeded Grass	Seeded Forb	Surviving Native Grass	Cheatgrass	Shrub
Drilled Upland	8.28±2.67	1.37±0.42	0.26±0.20	2.60±0.84	0.53±0.23
Aerial Upland	0.75±0.30	0.34±0.13	5.96±1.29	16.02±4.54	2.65±0.54
Aerial Riparian	1.32±0.61	0.64±0.35	8.43±2.47	18.28±9.77	9.84±5.78

Mean Densities (no. of plants/m^2) and Confidence Intervals of Measured Components for Each Treatment

Values to the right of the "±" indicate upper and lower bounds of a 90 percent confidence interval. the highest level of recovery by shrubs. Drill seeded upland sites showed the lowest level of shrub establishment.

were readily installed at a rate on 40 to 50 structures per day by 15 people. These structures provide a quick method to protect water quality on burned watersheds.

Cook concluded that successful seedings generally had a density of five seeded plants per square meter. After one growing season, data indicate that seeding with a rangeland drill is the most effective method to establish this density of seeded plants. The low response of seeded grasses and forbs on aerial-seeded upland areas demonstrates limitations of this seeding strategy. As many native grasses established on the aerial-seeded areas as seeded perennial grasses on the drill-seeded areas. The differences in seeding success between sites are difficult to account for with current information. One explanation could be the amount and permanence of snowpack on which aerially applied seed was placed. Subsequent studies will address this topic by monitoring site differences.

Seeded species also had limited success in riparian zones. The prolific growth exhibited by rhizomatous grasses, sedges, sprouting woody vegetation and weedy species likely presented high competition for seeded species. After the first growing season, there was dense cover in the riparian zones. This level of cover, after one growing season, raises the question whether it is necessary to seed riparian zones after a fire. The mesic environment in riparian zones allows vegetation to recover naturally, even in intensively burned areas.

Success of seeded species in the drill-seeded sites may provide the best inhibition of cheatgrass establishment. This treatment, however, is limited by terrain and cannot be employed on all parts of ranges that are intensively burned. Cheatgrass density was greater in aerial-seeded areas where seeded species did not competitively establish, although pre-fire cheatgrass densities are not known. We expect the perennial vegetation to expand more aggressively in riparian zones to the possible detriment of cheatgrass and other annuals.

Site characteristics such as slope, aspect and soils are the most important geophysical features to be considered in fire rehabilitation evaluation. Future monitoring will focus on species adaptability to various sites, treatments and applications. It is reasonable to expect that plant species will grow more aggressively in the second and subsequent growing seasons. Broader vegetation parameters will be measured in the future to reach a more comprehensive understanding of the success of watershed rehabilitation techniques after fire.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the con-

tributions and efforts of Floyd DeWitt, Kimberly Hackett, Steve Popovich and Dennis Fielding.

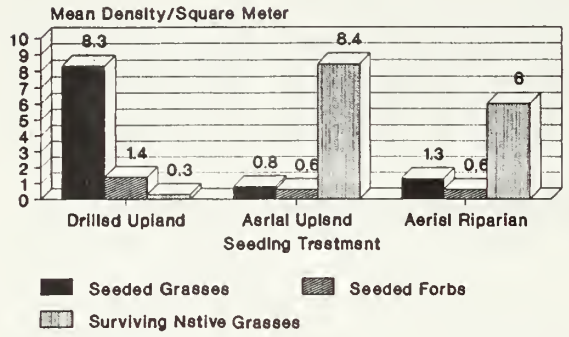

Figure 1. Seeded Grasses and Forbs vs. Surviving Native Grass Survival After One Growing Season

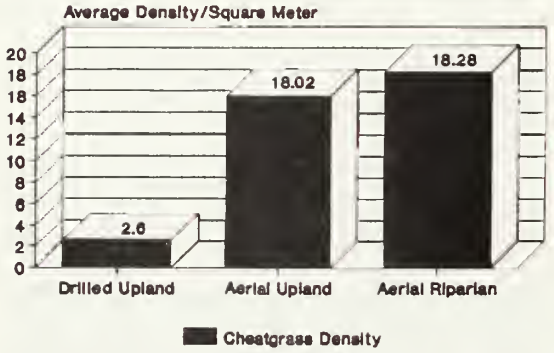

Figure 2. Cheatgrass Establishment

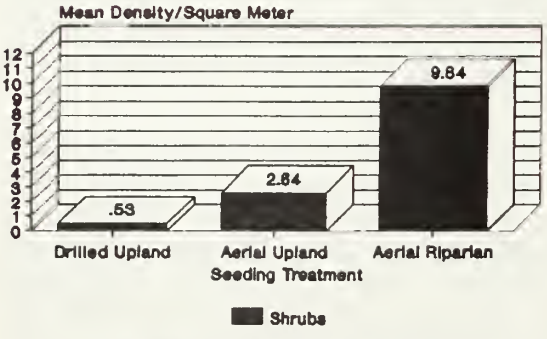

Figure 3. Live Shrub (primarily big sagebrush) Establishment from Natural and Planted Sources

Fish Creek Restoration Project

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The Fish Creek Restoration Project is implementing the BLM's mission in a number of ways. The project is promoting collaborative leadership, serving current and future publics, and maintaining healthy ecosystems.

On July 23, 1991, a fire burned 70 acres in the Fish Creek Basin. This area is located in the Buffalo Valley Allotment 40 miles south of Battle Mountain, Nevada and is managed by the Shoshone-Eureka Resource Area of the Battle Mountain District.

The fire proved to be a catalyst for a cooperative effort involving a Boy Scout Troop, the Lander County Rod and Gun Club, community volunteers, the permittee, the Nevada Division of Forestry, and several divisions and disciplines within the Battle Mountain District.

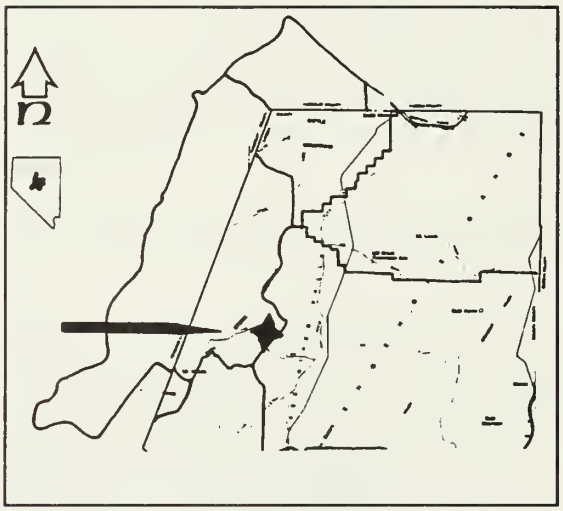

Figure 1. Location of Fish Creek Restoration Project

The burn included an axial-stream and inset fan as well as the riparian area along Fish Creek. After surveying the burned area, it became evident to the inter-disciplinary reclamation team that revegetation of the area was necessary to prevent soil and water erosion, restore wildlife habitat, restore grazing capacity, rehabilitate the damaged riparian area, maintain and improve water and air quality in the watershed, and reduce fire hazards in the future.

Restoration started when the Battle Mountain Operations Division worked with the Nevada Division of Forestry to reseed the area with handcrews. The permittee in the allot-

Figure 2. Fish Creek fire –August 1991.

ment agreed to herd his sheep away from the area until the vegetation re-establishes.

Specialists in the Shoshone-Eureka Resource Area saw an opportunity when Boy Scouts leaders asked for project ideas so a Scout could earn an Eagle Badge. Noting the beginning improvement of the Fish Creek riparian area, the BLM suggested an erosion control project on the Fish Creek burn. The future Eagle Scout accepted the challenge and ran with it. The Scout enlisted volunteers from Boy Scout Troop 250, the Lander County Rod and Gun Club, the BLM, and the greater Battle Mountain community in the winter of 1991-2.

Discarded Christmas trees were collected from the community in response to a BLM news release. The Boy Scout then coordinated the effort to haul the cast-off trees to the burn. Erosion checks of piled trees were constructed in gullies and stream channels. In addition to collecting silt, slowing runoff, rebuilding stream channels, the tree plugs serve as escape and hiding cover for quail and cottontail rabbits native to the Fish Creek Basin.

Bureau employees continued the reclamation effort by planting willow cuttings the following spring.

The next winter, another Scout earned his Eagle Badge by repeating the effort to collect donated Christmas trees and haul them to the Fish Creek burn. More plugs were installed to reduce erosion and raise the water table. Willows were again planted last spring to enhance the stream and to improve wildlife and watershed values.

Overall, this project promoted collaborative leadership within the Bureau among divisions

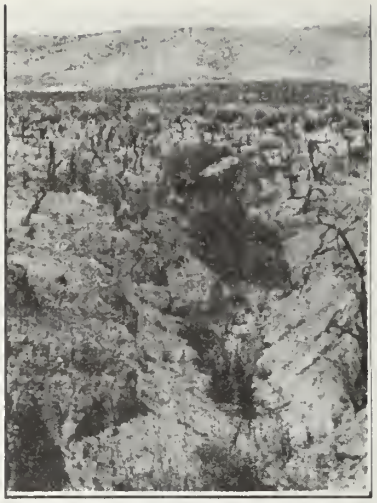

Figure 3. Recycled Christmas trees catching silt.

and with the publics the Bureau serves. The improving ecosystem in the Fish Creek Basin is serving current and future publics by restoring a watershed, providing better habitat for wildlife, and reestablishing a forage base for many uses.

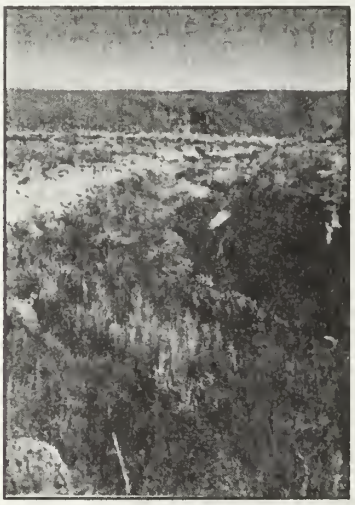

Figure 4. Fish Creek – August 1993.

Figure 5. Revegetation of burned area– August 1993.

Fish Slough: From Ancient Wetland to Community Stewardship

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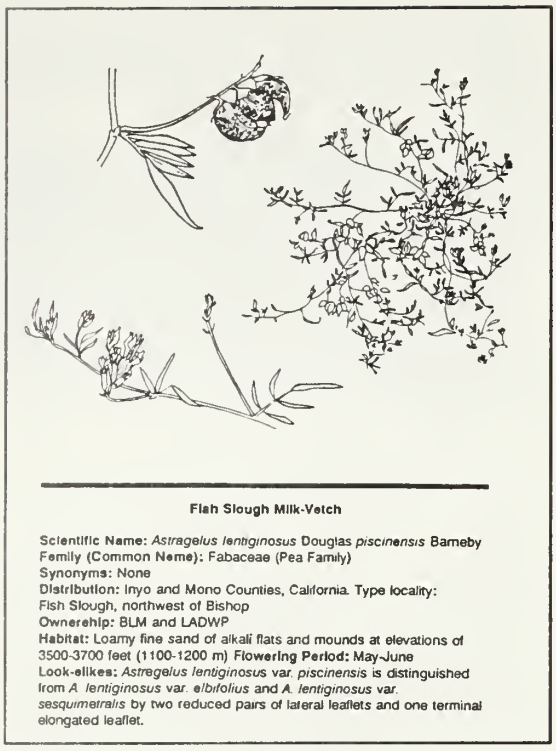
Geologic processes at Fish Slough created an isolated desert wetland where fresh water would flow and unique, diverse plants and animals would flourish. These set the stage for prehistoric and historic human use, which in turn led to recognition of the need to manage the Fish Slough ecosystem with a vision that encompasses a broad sweep of time.

The Landscape: Formed by Cataclysm- A cataclysmic event transformed this part of eastern California, at the north end of the Owens Valley and east of Long Valley. Hot ash flowed like a scorching avalanche out of the Long Valley Caldera 730,000 years ago, blanketing the landscape several hundred feet deep for miles around. This pyroclastic flow fused to create the porous white, pink, and tan rock called Bishop Tuff that makes up the Volcanic Tableland. Later, faulting action warped and cracked the Tableland, lifting some parts and dropping others. The smooth surface was cut into blocks that were further eroded into jagged or oddly curving forms. Along the largest fault, a huge block of land was thrown down to the level of the water table so that a rich wetland oasis was formed.

Water percolates through the Tableland's porous rock to emerge from three perennial, free-flowing freshwater springs. The springs are surrounded by seasonally flooded marshlands. These, in turn, are bordered by seasonally saturated alkali meadows, frosted with a white crust of minerals left by evaporating water. The geology and hydrology of Fish Slough and its surroundings have created a land of contrasts, the setting for an unusual diversity of life.

The Ecosystem: Biological Diversity- Fish Slough is located in the transition between the Mojave Desert and Great Basin climatic regimes and biomes. The unique biota of the Fish Slough ecosystem reflect the climatic and geographic transition, as well as dramatic gradients of abiotic factors within the system. Few ecosystems encompass such an array of habitats in such close concert.

Springs, streams, and ponds support a thriving aquatic life, including the Owens pupfish (*Cyprinodon radiosus*), Owens tui chub (*Gila bicolor snyderi*), and Fish Slough springsnail (*Pyrgulopsis perturbata*). The water is alkaline and high in dissolved solids, especially calcium, bicarbonate, sulfate and sodium. The slough provides a distinctive refugium for plants and



Fish Slough Milk-Vetch

Scientific Name: *Astragalus lentiginosus* Douglas *piscinensis* Barneby
Family (Common Name): Fabaceae (Pea Family)
Synonyms: None
Distribution: Inyo and Mono Counties, California. Type locality: Fish Slough, northwest of Bishop
Ownership: BLM and LADWP
Habitat: Loamy fine sand of alkali flats and mounds at elevations of 3500-3700 feet (1100-1200 m) **Flowering Period:** May-June
Look-alikes: *Astragalus lentiginosus* var. *piscinensis* is distinguished from *A. lentiginosus* var. *elbifolius* and *A. lentiginosus* var. *sesquimetralis* by two reduced pairs of lateral leaflets and one terminal elongated leaflet.

Figure 1.

animals adapted to this unusual water chemistry.

Where the moisture and salinity continuum shifts into seasonally flooded marshes and alkali meadows, species richness increases. With 126 wetland taxa described, Fish Slough represents one of the richest wetland floras. These sites provide habitat for rare endemic plants such as the Fish Slough milk-vetch (*Astragalus lentiginosus* var. *piscinensis*) and alkali mariposa lily (*Calochortus excavatus*).

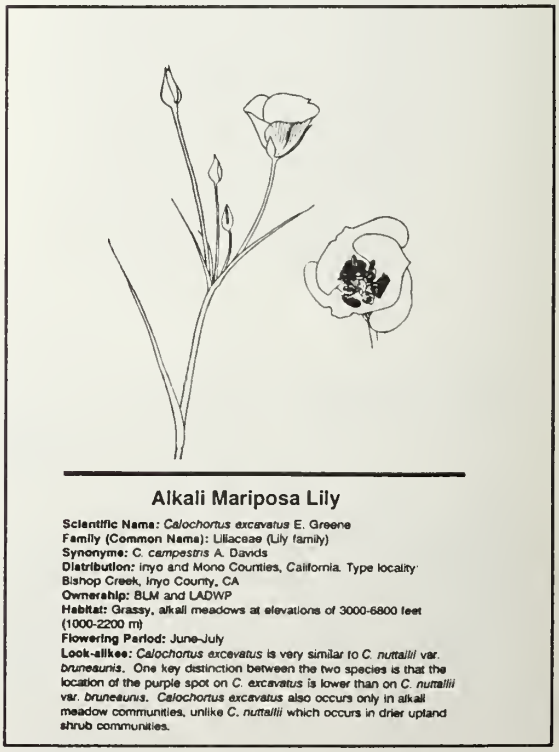
Alkali meadows shift to escarpments composed of coarse Bishop Tuff. These uplands support diverse drought-adapted plant and animal communities. In spring these rocky, undulating slopes come alive with ephemeral wildflowers.

Fish Slough is a veritable refuge of biological diversity, a place where geographic isolation, geology, climate, and hydrology continue to drive a rare and irreplaceable ecosystem.

Prehistory: A Land of Abundanc- Ho-nova-wa-go was a name given Fish Slough by Owens Valley Paiutes, the most recent of a succession of Native American cultures to occupy the valley. Abundant food resources attracted people to Fish Slough long ago. Freshwater mollusks were collected, and small native fish were scooped up by the basketful. Deer and waterfowl provided meat, and many seeds were harvested and carried in baskets. Baskets were essential to people who often travelled far on foot in search of seasonal food sources. Owens Valley Paiute baskets were lightweight, durable, closely woven symmetrical and intricately patterned; Fish Slough served as a source of basket materials since ancient times. Owens Valley Paiutes also made pottery, and pottery sherds are found at Fish Slough archaeological sites, as are lithic scatters and rock rings which may mark temporary house foundations, food caches, or hunting blinds.

Most conspicuous and mysterious are the many petroglyphs, prehistoric rock art patiently chipped onto smooth rock faces. Some petroglyph sites are near game trails and may have been associated with hunting, but for the most part, the geometric patterns, animal figures, and other enigmatic designs are of unknown meaning today.

History: Changing Values- Ranchers and miners began to settle in the Owens Valley in the 1860s. A stage route through Fish Slough brought travellers and supply wagons from Owens Valley farming towns to gold and silver boom towns like Benton, Bodie and Aurora.



Alkali Mariposa Lily

Scientific Name: *Calochortus excavatus* E. Greene
Family (Common Name): Liliaceae (Lily family)
Synonyme: *C. campestris* A. Davids
Distribution: Inyo and Mono Counties, California. Type locality: Bishop Creek, Inyo County, CA
Ownership: BLM and LADWP
Habitat: Grassy, alkali meadows at elevations of 3000-6800 feet (1000-2200 m)
Flowering Period: June-July
Look-alikes: *Calochortus excavatus* is very similar to *C. nuttallii* var. *bruneaunis*. One key distinction between the two species is that the location of the purple spot on *C. excavatus* is lower than on *C. nuttallii* var. *bruneaunis*. *Calochortus excavatus* also occurs only in alkali meadow communities, unlike *C. nuttallii* which occurs in drier upland shrub communities.

Figure 2.

Stockmen used the same route, now Fish Slough Road, for cattle drives between summer and winter pastures.

Early this century, water became one of the Owens Valley's most sought-after resources. In the 1920s and 30s the City of Los Angeles acquired riparian lands and water rights in the Owens Valley, including Fish Slough, to provide water to the city. Throughout the Owens Valley much aquatic habitat had already been lost to diversions for agriculture; now more was lost to the city, but Fish Slough was incidentally set aside from intensive agricultural or residential development.

Native fish species were impacted by the loss of wetlands and introduction of non-native fish. The Owens pupfish was thought extinct by 1948, but in 1964 a few were found surviving at Fish Slough. California Department of Fish and Game (CDFG), Bureau of Land Management (BLM) and Los Angeles Department of Water and Power (LADWP) cooperated in establishing the Owens Valley Native Fish Sanctuary for the pupfish and other native fish in 1969. The sanctuary ponds were constructed just in time: it was a dry summer and the small pools in which the pupfish survived completely evaporated. The uniqueness and fragility of Fish Slough's resources were becoming strikingly evident.

Modern Management: A Collaboration- The BLM, Bishop Resource Area, identified Fish Slough and its watershed in 1982 as an Area of Critical Environmental Concern. The designation recognized Fish Slough's importance as the last Owens Valley wetland to retain most of its natural integrity as an ecosystem, including critical habitat for endemic fish and plants. It also acknowledged its significant scenic values and potential for non-intensive recreation, and the vulnerability of all these resources to adverse change.

Five agencies cooperated in developing a 1985 Management Plan for Fish Slough. Three are landowners: BLM, CDFG, and LADWP. The other two, the U.S. Fish and Wildlife Service and University of California Natural Reserve System, share an active interest in the ecosystem.

These five agencies continue to share responsibility for Fish Slough today.

The Joint Management Committee meets annually to report on completed projects and monitoring results, and to identify new actions. Other interested parties, such as the Audubon Society and Desert Fishes Council, often provide input. The committee, charged with both day-to-day and longterm management of Fish Slough, attempts to reach consensus within the context of the different agencies' requirements and regulations.

Volunteers: An Outreach Network- The Eastern Sierra Audubon Society coordinates a volunteer work force that is instrumental in implementing the Management Plan. Community members conducting weekend patrols provide a BLM volunteer presence, give visitors information on resources and resource protection, help maintain a spring flow meter and weather station, record natural history observations such as bird sightings, rake out any offroad vehicle tracks they find, and report any other problems they observe.

Audubon work parties take on major projects such as twice-a-year cleanups, fence construction and maintenance, and closing and rehabilitation of unauthorized vehicle routes. One long-term project is a petroglyph inventory, which entails photographing and mapping all known sites.

Ecosystem Protection: Proactive and Watershed-wide- Two of Fish Slough's fish species, the Owens pupfish and Owens tui chub, are now listed as endangered; and two alkali meadow plants, the alkali mariposa lily and Fish Slough milk-vetch, are being considered for listing. Protecting these means protecting the biotic and abiotic components of the ecosystem that sustains them. The Management Plan directs preservation and enhancement of wetland integrity to ensure stable, healthy populations of native plants and animals. The Volcanic Tableland is managed to protect its scenic quality and the groundwater aquifer supporting the Slough.

Ongoing projects include monitoring flora and fauna, especially species of special concern; removing non-natives, such as largemouth bass and salt cedar, that compete with native species; wildfire management that recognizes the natural role of fire; limiting livestock grazing; and monitoring groundwater levels. The ecosystem approach to protection of species will be exemplified by the new interagency Owens

Valley Multi-Species Recovery Plan, in which Fish Slough will play a key role.

The Management Plan also calls for maintaining public access and recreational use in harmony with the natural system. An off-highway vehicle plan combines vehicle restrictions with public education on why and how to protect the ecosystem.

Research: A Natural Laboratory- Fish Slough offers researchers the opportunity to explore biological and cultural questions in a unique natural laboratory setting. Establishment of the Fish Slough ACEC catalyzed one of the most fundamental and essential levels of research - the collection of baseline information on the floral, faunal, geological, hydrological and cultural components of this dynamic desert wetland oasis. The biotic inventory of Fish Slough subsequently compiled by several eminent University of California at Santa Barbara researchers provides the most comprehensive work for this area and is an important template for current and future research projects.

Research at Fish Slough is as varied as the complex functions and biological diversity of the ecosystem that evokes the questions. The following are just a few of the research topics that contribute to understanding and sound management of the exceptional resources that comprise the Fish Slough ACEC: reproduction biology of rare plants; spring hydrology, including origin and flow rates; monitoring fluctuations and densities of endemic desert fish populations; and many aspects of cultural land use history, such as use of biological resources and site distribution patterns.

Environmental Education: Learning to Care- We all know that riding mountain bikes exposes us to natural and historic sites that our non-riding friends don't get to see. When we ride our bikes, we meld with our natural surroundings. The world opens to us. Questions are raised.... Imagine a ride where the experts rode along - a ride where at designated sites, they'd explain the secrets of an unfolding geology, a delicate biology and the lost traditions of native people who lived in harmony with a harsh yet generous land.

- From "Mountain Bike Field Trip" by Jim Hasenauer, *California Bicyclist*, April 1992

a trip to Fish Slough highlights one aspect of an environmental education program that brings students into contact with their subjects: bicycling through geological zones, wading into a marsh to learn about aquatic life, sitting on a rock to draw petroglyphs another artist left thousands of years ago, helping monitor endemic plants or rehabilitate a hillside eroded by offroad vehicle use. The goal is to impart, along with knowledge, sensitivity and a sense of stewardship for unique and fragile lands.

The program is coordinated in cooperation with Eastern Sierra Institute, the Inyo County Office of Education, and other local, state, tribal and federal groups. Bicycles and equipment were donated by Schwinn, Specialized, and mountain bike philanthropist Dr. Al Farrell. Teachers include BLM staff, other scientists and resource specialists, and Native Americans with knowledge of their ancestors' ways. Students include local grade school children, "at risk" minority or disadvantaged youth, high school science students from southern California cities, university field schools, and college professors seeking to incorporate similar approaches into their own programs.

Recreation: A Place for People- Recreational uses of the wetland and Volcanic Tableland have long been locally popular. Some uses have caused problems, as when soils and vegetation have been impacted by offroad four-wheel-drive or motorcycle use, or native fish have suffered competition and predation by game fish introduced by fishermen. For the agencies that manage Fish Slough, today's challenge is to guide and inform visitors, both local and tourist, toward low-impact recreation in harmony with the natural integrity of the ecosystem and its cultural treasures.

Some visitors focus on the biotic environment itself. Fish Slough is a designated Watchable Wildlife area and offers rich opportunities for birdwatching, photography, and other nature observations. A visitor might watch blue herons glide over the marsh, listen to red-winged blackbirds call, or search for a glimpse of a bittern, Virginia rail or marsh wren hiding in the reeds; identify wildflowers, including ones that bloom nowhere else; or sit by a clear spring and watch Owens pupfish flash blue and silver breeding colors as they defend their territories. Others come seeking a glimpse into the past. A hiker on the Volcanic Tableland might look for rock rings, lithic scatters, or little-known petroglyph sites. Mountain bicyclists and off-highway vehicle enthusiasts explore miles of unim-

proved routes. Vehicle travel is managed under the "semi-primitive" philosophy: no special facilities are provided, signs and other intrusions are minimized, no offroad travel is allowed, and visitors are encouraged to enjoy the natural setting and a sense of solitude and adventure as they explore existing routes.

Fish Slough: Into the Future- Fish Slough exemplifies concepts of community stewardship that will drive land management in the future. The priority is ecosystem health on a watershed scale. The basis is sound science, supported by ongoing monitoring and research. The process is interagency collaboration, together with public organizations and interested individuals. Volunteers add energy, efficiency and diversity to the workforce, and help carry concepts and concerns between agencies and public. Environmental education involves a broad sector of the community, local and beyond, in learning to care for the land. The public is served by opportunities to enjoy uses of a landscape managed so that its values are enhanced and maintained for future generations.

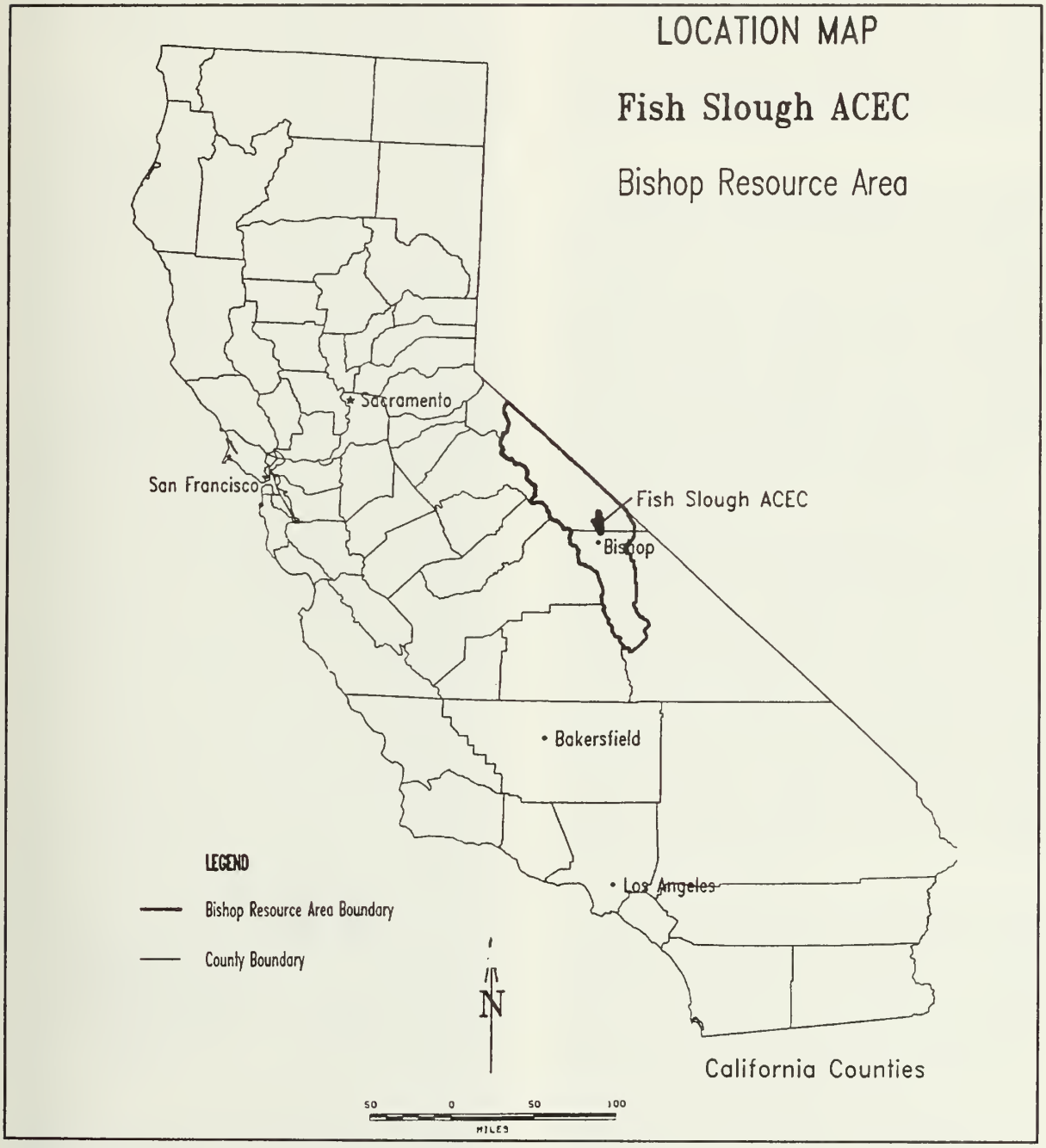


Figure 3. Fish Slough location map.

Fort Stanton Special Management Area

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Introduction- Established in 1853, Fort Stanton lies in the foothills of the Sierra Blanca Mountains of south central New Mexico and is about 16 square miles in size. As a former military reservation the area has never been part of a grazing district nor has it ever been a grazing allotment. Livestock grazing in the area has been limited to U.S. Army use until 1896, livestock raised in support of the tuberculosis sanatorium until 1950, or for grazing studies conducted by New Mexico State University until 1990.

Fort Stanton contains two major water courses the Rio Bonito and its tributary Salado Creek. The Rio Bonito headwaters are 12 miles to the west of Fort Stanton in the Sierra Blancas and Salado Creek headwaters are 10 miles to the northwest near Vera Cruz Mountain.

Before the projects at Fort Stanton began the conditions of both Rio Bonito and Salado Creek could be characterized by the following attributes: wide and exposed gravel bars; wide and shallow water flow; a wide arroyo or gully appearance of the streambed accompanied by steep or vertical banks; an invasion of non-native vegetation such as russian olive and salt cedar; encroachment of upland tree species; and the disappearance of willow and cottonwood along much of the stream banks.

The Project- Since the condition of riparian area affect not only the land vegetation and animals in the immediate area but also the surrounding areas, BLM selected the Rio Bonito and Salado Creek as demonstration areas for riparian restoration and enhancement. The goal of this project was to restore the native riparian vegetation and function. A side benefit is the increased water quality and quantity in the streams. Project work began in 1982 with the construction of fencing that would exclude livestock from certain areas along the Rio Bonito.

Knowing that merely excluding livestock from parts of the riparian areas would not be sufficient to restore the quality of the area, resource specialists embarked on a series of projects in and along the streams. Willow cuttings and cottonwood poles were planted in the exclosures. Rock-filled gabions and small check dams were constructed in the stream to slow water flow and develop pools. Points were established to monitor the water table.

Projects away from the streams themselves were initiated to reduce soil erosion and the sediment load of the streams. Projects to stop head cut erosion and gullies were installed in the watershed surrounding the streams.

In riparian areas where native riparian vegetation remained projects were developed to remove non-native and dry land vegetative invaders. One-seed juniper salt cedars and russian olives were cut down and the tops and limbs were scattered. To remove the slash and deal with resprouting these areas were burned with prescribed fire. Additional burns are planned to maintain the native vegetation and prevent reinvasion of unwanted species.

In the riparian enhancement areas check dams and gabions were constructed to slow the stream flow and form pools. The eroding heads of gullies were stabilized to reduce the sediment load in the stream. In other areas the tops and limbs of cut junipers were used to stabilize the stream banks and prevent erosion

Riparian pastures were created to better manage livestock use in riparian areas. A period of rest was imposed to allow native vegetation to reestablish and to protect the enhancement projects. In areas where the riparian vegetation was sufficiently established to withstand impacts, limited livestock grazing has been allowed. Grazing occurs only from August to April over most of Fort Stanton. This allows summer rest each year for improved forage growth and allows seeds to develop on grasses in the uplands. Most grazing in riparian areas occurs in the spring and is of short duration typically two to three weeks in length. This grazing method reduces amounts of forage that may become decadent and helps stimulate new growth.

Results- In the original exclosures results have been dramatic. Bare gravel bars are now covered in bulrushes, sedges, fescues and pockets of cattails. The adjacent streambanks are densely covered with grasses. Willow cuttings and cottonwood poles show dramatic growth. Water runs deep and clear in a narrow channel in several stream reaches. The water table is rising and the base flows are extended.

Both Rio Bonito and Salado Creek are prone to floods due to spring runoff and rainfall. One of the benefits of dense streamside vegetation is reduced sediment load carried down stream. Stream sediment is trapped by the enhanced riparian vegetation, deposited along the stream course improving channel depth.

In the riparian enhancement areas, removing non-native plants, stabilizing banks and the improving aquatic habitat has increased the diversity of terrestrial and aquatic species in the area. Beaver activity is encouraged as part of the natural function of this ecosystem. Fish habitat has improved because the water is cooler, deeper and more persistent throughout the year. Seasonal grazing, carefully monitored has proven practical and beneficial to the area.

Projects in the Fort Stanton Special Management Area have reached the stage where using before and after photographs, BLM can demonstrate how a riparian ecosystem can return to good health while allowing multiple use, including livestock grazing. By 1990, the condition of the riparian habitat at Fort Stanton had improved to the point that on Earth Day, BLM designated the area as its first National Riparian Showcase.

Future Possibilities- More than maintaining ecosystem health, the Fort Stanton Special Management Area demonstrates the management techniques and alternatives that can he used to restore and enhance a riparian ecosystem. With this special management area, BLM can show to the public, both now and in the future, which techniques and alternatives are effective for riparian enhancement, upland vegetation management, management of recreation and livestock grazing.

BLM is exploring opportunities for entering into cooperative management agreements with adjacent private landowners and state agencies. This development of partnerships would extend the effect of riparian enhancement efforts across jurisdictional boundaries and demonstrate the possibilities of cooperative management to improve local ecosystems.

Fort Ord, California A Model For Military Base Closure & Economic Recovery- The BLM's Leadership Role in T&E/Wetland Habitat Protection and Coordinated Multi-Agency Planning

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Fort Ord is a 28,000 acre U.S. Army base located on Monterey Bay adjacent to the Monterey Peninsula between the cities of Monterey, Seaside, Marina, and Salinas. The base was identified for closure by Congress in 1990. Subsequently, it was identified by the Department of Defense and the Administration as a national model for the President's base closure and realignment initiative. The BLM has had a leadership role in the development of a strategy that will allow timely reuse of the base and subsequent economic recovery, while also providing protection for rare natural habitats that support 44 special status species.

The cornerstone of Fort Ord reuse will be a new California State University campus with projected build out to 20,000 students, and a University of California facilitated research park. Both of these university initiatives are expected to focus on oceanographic and environmental education and research.

The BLM fostered Coordinated Resource Management Plan (CRMP) is expected to become the primary mechanism for implementation of strategies to manage natural resource lands and unique habitats at Fort Ord. This central BLM role has been endorsed by the U.S. Army, USF&WS, the community Fort Ord Task Force established by former Congressman Leon Panetta, the Fort Ord Reuse Group which is composed of representatives of adjacent political jurisdictions, and the Monterey County Board of Supervisors.'

The "Installation-Wide Multispecies Habitat Management Plan for Fort Ord, California" provides the basic guidance for concurrent economic recovery and habitat protection on Fort Ord lands. The plan designates three primary habitat conservation areas to be managed by the BLM (15,000+ acres), the University of California Natural Reserve System (approx 1,000 acres), and California State Parks (approx 1,000 acres). These areas would be connected by habitat corridors where some development would be permitted. The habitat corridors would be managed by the County of Monterey and the City of Marina. Establishment of these conservation areas and habitat corridors will allow unimpeded development of the remainder of the base to support economic recovery of the region.

The CRMP would provide a vehicle for all

the public agencies to develop consistent management plans and to pool resources to minimize duplication. On a small pragmatic scale, this represents an opportunity to demonstrate how local, state, and federal sectors can work cooperatively to "reinvent government." Each of the affected agencies and local special interest groups have indicated a strong interest in participating in the BLM fostered CRMP process. The involvement of the University of California and California State University provide additional opportunities to also use the CRMP as a vehicle to facilitate relevant scientific research and to integrate science into local public policy decision making.

Because the Fort Ord CRMP proces already has the support of all potential participating agencies, the regulatory agencies, the local/state political jurisdictions, and the local community, the prognosis for a timely success story is very good. The Fort Ord CRMP represents an opportunity to show how ecosystem management principles can actually be implemented on-the-ground through commitment to an inter-agency, multi-jurisdictional planning and management process.

Relationship to BLM summit themes - Because the conversion of Fort Ord from military to civilian uses is a new endeavor that has been evolving rapidly during the past two years and is touted as a model for other military base closures, there have been numerous opportunities to "reinvent" government. The continuing recession in California and the weakening of the local economy by the loss of the military sector have provided additional incentive for local, state, and federal agencies to reevaluate their respective roles and relationships. It is within this backdrop that the BLM has emerged at Fort Ord as a leader in the development of collaborative inter-governmental strategies for protection of sensitive environmental resources while still providing opportunities to foster economic recovery.

The BLM's newly evolved role at Fort Ord has been guided by current Presidential, Departmental, and Agency guidance that has profiled a vision for the agency in the 21st century. This guidance has included (1) providing assistance to local communities adversely impacted by endangered species protection and military downsizing, (2) integrating science into public policy decision making, (3) applying biodiversity and ecosystem management principles to land use and T&E management, protecting riparian/wetland resources, and being proactive to prevent rare species from becoming endangered, and (4) promoting workforce diversity.

(1) Providing Assistance to Local Communities - The President has indicated strong support for providing economic assistance to communities adversely affected by endangered species protection and military downsizing. At Fort Ord the BLM is retaining key endangered species habitat in federal ownership with the federal government retaining primary responsibility for Endangered Species Act compliance. This will eliminate a potentially devastating financial burden and regulatory uncertainly that could affect the ability of local governments and communities to recover from the closure of Fort Ord.

(2) Improving Scientific Decision Making - The BLM is developing new relationships with California State University and University of California scientists to foster cooperative research and to integrate current research into BLM management of Fort Ord lands. This summer the BLM and California State University's Moss Landing Research Laboratory will be cosponsoring a scientific workshop on Fort Ord Fire Ecology. The University of California and its associated Natural Reserve System staff are expected to be key participants in the development of a CRMP. University staff have already initiated plans to integrate graduate and faculty studies with BLM management needs.

(3) Ecosystem, T&E, & Riparian Management - New BLM managed lands at Fort Ord support 35 rare species including seven species that could be dependent on Fort Ord BLM lands for their survival. USF&WS has indicated that BLM management of Fort Ord lands would preclude the emergency listing of several C-2 species as endangered. Fort Ord is the largest and most significant remnant of maritime chaparral habitat remaining. Wetland resources include about 22 coastal vernal pools, nine pond/freshwater marsh areas, five miles of coast live oak riparian forest, and species-rich sycamore & California buckeye riparian forest. The basewide Multi-species Habitat Management Plan (HMP) and the BLM's Coordinated Resource Management Plan are providing the groundwork for development of a multi-agency, multi-jurisdictional

strategy for consistent and efficient management of these rare ecosystems.

(4) Promoting Workforce Diversity - Fort Ord is surrounded by ethnically diverse communities with well established Black, Asian, and Hispanic populations. The BLM is working closely with the new California State University of Monterey Bay staff developing curriculum and an expansive intern program for the new campus that will support BLM workforce diversity objectives. Cooperative BLM and community young adult training & work programs, based on the California Conservation Corps model, are also currently being developed in partnership with local community leaders.

Geo Sciences - A Link To Data Information Sharing

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Consensus, indeed! Everybody agrees that new technologies are driving the information network at an astonishing speed. Quick! Lets jump on the geospatial turbo-charged data wagon now, our guarantee to move us along the information zoom-ways!

Fueled by the "Strategic Plan for Managing the Public Land Survey System", signed by Mike Dombeck on March 23, 1994. The strategic goals in the plan emphasize the maintenance of the Nation's Cadastral infrastructure and the development of spatially referenced information systems to enhance, improve and maintain all aspects of data sharing to better meet the needs of our customers.

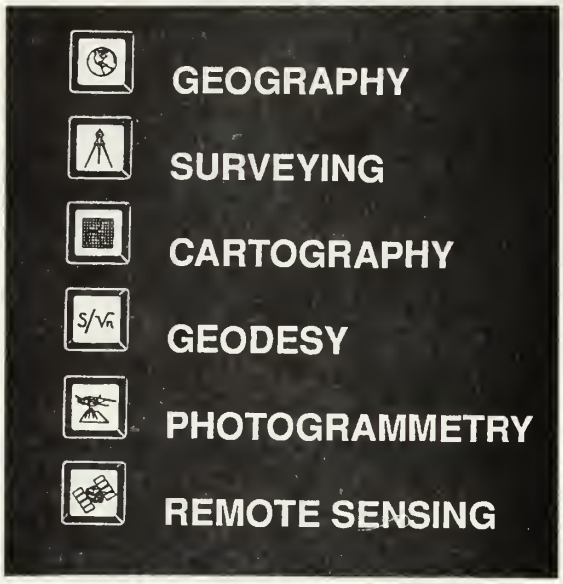

Figure 1. Geo-Science diciplines.

The key to the Geo-Sciences demonstration exemplified the technical integration associated with land surveying, geo-positioning, relational data bases, and computerized geo-

Figure 2. A BLM cadastral surveyer using a GPS reciever.

graphic information systems. Mapping projects exhibited how GPS provides a direct link to GIS systems and how layering information on a GIS map delineates specific resources or problem areas on the public lands.

Shifted into gear by the cooperatve efforts of the Geo-Sciences. Teamwork tasks represented that the spatial interrlationships create the base layer which ties the sciences to the landscape to identify ecosystem diversity, functionality and integrity.

Figure 3. Just another preetty picture....not anymore, theres a new global geography in them thar hills.

Accelerated by the data sharing efforts already in place within BLM's Geo-Sciences. Managers should know about the Federal Geographic Data Committee (FDGC), created by OMB Circular A-16, is charged with coordinating federal activities in conjunction with state and local governments and the private sector to develop the National Spatial Data Infrastructure (NSDI). The standards and partnerships secured by NSDI will promote more cost-efficient production, ready availability, and greater use of high-quality geospatial data.

Insurance lies within the geo-related capabilities of the Geo-Sciencs to display information and create the data link as an adaptive management tool. In addition, the policy should underwrite continuing education as a vital function. The National Training Center presently offers courses that support advanced geo-data collection and use training for the Geo-Science disciplines. An integral part of the whole ecosystem based management operation is to maintain a staff of trained professionals

Figure 4. Spatial Data in a GIS can be displayed graphically with great versatility using computer technology. Sophisticated uses can be applied for data capture and analysis both optically and digitally under BLM's ALMRS/Modernization system.

GLO Automated Records Project

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With custody of more than 9 million pages of historic land documents which must be made available for general research, BLM's Eastern States took a futuristic approach in designing their public service and document preservation efforts.

The land patents, survey plats, and cadastral survey field notes maintained by Eastern States are manually researched daily by title abstract companies, genealogists, and federal agencies. Although considerable time and money has been spent in previous years to maintain the integrity of the records through special binding and lamination processes, the constant handling has caused irreparable deterioration. Many of the documents are the only available records of ownership for these lands, especially for the southeastern states where fires destroyed courthouses during the 1800s. Preserving the priceless records became paramount.

Eastern States selected optical imaging technology to electronically duplicate each land patent onto laser disks.

Information about each patent image has been entered into a data base which permits queries by name, state, land office and more from computer terminals at BLM, or at other locations via modem. The Project is following the Automated Lands and Minerals Recordation System (ALMRS) data content standards to populate its database to facilitate future integration of the GLO Records. Appropriate document images can be mailed or telefaxed from Eastern States upon request. Research that took sometimes weeks to complete can now be accomplished in minutes.

BLM has automated more than 1 million land patents dated prior to 1908 for the States of Arkansas, Louisiana, Florida, Ohio, Minnesota, Michigan, Mississippi, and Wisconsin. Patents for the remainder of the 13 eastern public domain states will be ready for electronic access by 1998.

Eastern States has also taken a giant step toward improved customer service by offering the automated land patent data on CD-ROM. These state-by-state compact disks offer BLM customers the luxury of conducting research in their own offices and homes. Disks containing data on land patents dated prior to 1908 for the States of Michigan, Florida, and Loui-

siana can be purchased for about $15 each from the Superintendent of Documents. CDs will be issued for other states as the GLO automation efforts continue.

Showcase Content:- As a supplement to the showcase, Eastern States produced a map of the 31 eastern states highlighting those public domain states whose land records have been automated. Also included is the status of the automation effort. This handout is attached as Figures A-1 and A-2..

Figure A-1

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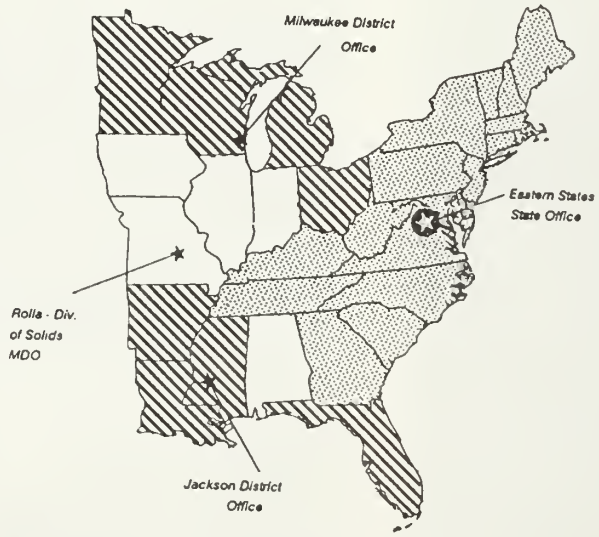
GLO Automated Records Project



ORIGINAL 13 COLONIES AND TERRITORIES
(Land Records are under States' jurisdiction)

EIGHT STATES ENTERED INTO GLO AUTOMATED RECORDS SYSTEM AS OF February 1994 - Pre-1908 Patents
(Other States will be entered by October 1998)

JURISDICTION: Menegement of Federel ownership in 31 States adjoining or eest of the Mississippi River. Approximately 30,000 ecres of widely-scettered Federal surface and 39 million acres of Federally-owned minerals, most of which are beneath surteca edministered by other Federal agencies or owned by the States or private individuals.

Figure A-2

Groundwater Monitoring and Mechanical Integrity of Natural Gas Wells

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Groundwater Monitoring Program Background- Maintaining healthy ecosystems requires the best science available to determine the past and present condition of the environment and the impacts our activities have had and are having on it. Water, surface or subsurface, is a critical component of any ecosystem. In southwest Colorado, water is of particular interest since it is in short supply. Possible contamination of groundwater by methane gas became a major issue during the preparation of a joint BLM/USFS EIS for a proposed coal-bed methane (natural) gas well drilling program in the HD-Mountains. The presence of methane poses at least two hazards—accumulation in confined areas to an explosive level and depleting aqueous oxygen allowing poisonous hydrogen sulfide gas to be created by anaerobic bacteria. In addition, it causes fixtures to become stained with iron and other minerals.

It is unknown to what extent the methane in the groundwater is natural and how much, if any, has been contributed by leaking or improperly constructed natural gas wells. Public interest and concern from local governments has been high with respect to this issue for several years. The "checkerboard" of ownership of the area makes it imperative that private landowners, local government, Indian tribal officials, state and federal agencies coordinate to obtain accurate and comprehensive data. Collaborative analysis of the information has lead to a better understanding of the technical aspects of the situation as well as improving political relationships among the various entities.

BLM Activity- The San Juan Resource Area initiated a proactive testing program to gather baseline information and has formally published the results and methodologies. In the fall of 1993, the San Juan Resource Area conducted over 200 tests of water wells in the HD Mountains EIS Study Area and within 1/2 mile of selected jurisdictional lands. The purpose of the testing program was three fold: (1) compliance with testing and monitoring commitments made in the EIS, (2) establishment of a 1993 groundwater quality baseline that can be monitored periodically to detect changes, and (3) identification of areas of concern which exhibit high methane concentrations. Data and results of the groundwater testing program were published in a document entitled *Dissolved Methane Concentrations in*

Groundwater, La Plata and Archuleta Counties, Colorado. Of the 201 tests conducted at 193 different sites, 144 (75%) had detectable levels of methane, with 47 of those (25% overall) having significant concentrations. Significantly elevated levels of methane were detected in 13 geographic areas. The first baseline information of its kind has been generated and procedures for obtaining this type of data have been set forth in detail. The report has been well received, numerous compliments garnished, and the credibility of BLM improved by the application of "good science". Based on an analysis of the results of these tests, the San Juan Resource Area has already initiated detailed follow-up activities and programs.

Ongoing efforts in other BLM programs including the mechanical integrity evaluation program have been and will continue to be integrated with the data derived from this study to better manage and enhance the ecosystems under our jurisdiction. Working with others, BLM will continue testing, monitor trends and develop plans for groundwater resource protection and mitigation. Current and future publics will be served by continued testing of gas well integrity and monitoring of groundwater to determine any impacts which may occur.

Gas Well Mechanical Integrity Testing Program Background- Improperly constructed, or deteriorating boreholes associated with oil and gas development not only fail to conserve the hydrocarbon resource, they are a potentially serious threat to groundwater resources. Migration and interzonal flows of brine and hydrocarbons in the annular space (behind casing) of wells may degrade water quality in aquifers. Often problems with mechanical integrity of oil and gas wells go undetected until leakage and/or contamination has occurred. Recently the presence of methane has been documented in some of the nearly 5600 water wells located in the Northern San Juan Basin of Southwest Colorado.

"Bradenhead" is a trade name commonly used in the San Juan Basin for the casing head. By installing valves and pressure gauges on the bradenhead, intermediate, and production casing strings, the annular space between casing strings can be monitored for pressure. If all casing strings are properly cemented and all hydrocarbon and brine bearing horizons sealed off, theoretically the annular spaces tested should not exhibit any pressure. By measuring the conditions in the well bore annular spaces one is able to identify whether necessary zonal isolation within the well bore is present.

The bradenhead test provides valuable data and information. Bradenhead testing provides insights which helps geologists and engineers not only determine if casing leaks are present, but it also provides clues as to the source of interzonal flows behind the casings. In contrast to traditional mechanical integrity tests, the bradenhead test can be performed quickly, without shutting in the well, is easy to complete and inexpensive.

BLM Activity - Since 1991, the San Juan Resource Area has developed and implemented a passive mechanical integrity testing program for natural gas wells which identifies potentially leaking wells. The program was instituted on a field wide basis for the Ignacio Blanco Field as an annual requirement for all jurisdictional wells. Also, since private and state lands administered by the Colorado Oil and Gas Conservation Commission (COGCC) are interspersed with federal jurisdictional lands, the resource area has worked extensively with the COGCC to coordinate test requirements and procedures to assure consistency.

This testing program has revealed that approximately 37% of the some 1000 jurisdictional wells tested had anomalous pressure in the annular space between the surface casing and the next casing string, with 10% having significant pressure.

This program has allowed us to assess the mechanical integrity of gas wells to identify and begin to remediate those wells which could be contributing to the loss of hydrocarbon resources and methane contamination. Site specific analysis of bradenhead test data is necessary to determine if mechanical integrity is present and to determine if interzonal flow may/has occurred. Approximately 100 wells have been remediated to date and work is continuing. Remedial cementing operations have been successful to a large degree, however proper primary cementing is the most important aspect in wellbore construction. The San Juan Resource Area has published two annual bradenhead reports which document procedures and findings. These are available to the public as well as other regulatory entities.

Improving Customer Service

The Albuquerque Administrative Support Center

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Administrative Support Center (AASC) was approved by the Washington Office late in Calendar Year 1992 and opened for business on April 19,1993 as a result of an analysis which was completed as part of the 2015 exercise to reorganize the Branch of Administrative Services. As a result of that analysis, it was determined substantial savings could be generated by consolidating several administrative functions in one office located in Albuquerque. We are a State Office Branch, however, we are co-located with the Albuquerque District Office. The major reason for the savings is location. Albuquerque is the only metropolitan sized city in New Mexico: each office does business with vendors in Albuquerque; the Interior Training Center is located in Albuquerque; and the largest job pool is in Albuquerque. In addition, to travel outside the state you must first go through Albuquerque.

The AASC is the Branch of Administrative Services, Division of Administration, New Mexico State Office and is comprised of three Sections: the Property and Safety Section; the Procurement and Contracting Section; both located in Albuquerque and the Office Support Section located in Santa Fe which services the State Office. The AASC reports to the DSD for Administration and is responsible for statewide operations of the following: all competitive procurements over $2,500; the state safety program, including training, facility inspections, technical assistance, and program policy; Real Property management, including initiation of a pilot project for the operation of a computerized program, Foundation Information for Real Property (FIRM), to provide more accurate real property inventory data for Worldwide Real Property Reporting. FIRM is a GSA program that replaces manually generated forms containing information on all real property holdings within a state's jurisdiction and can be consolidated into a Bureauwide report at the Service Center. The pilot will provide information for Washington Office on the viability of more field ownership of real property data as well as the possibility of giving the states more control of the real property program.

We have realized some real savings in consolidating these functions on a statewide basis. Although the AASC has existed for only one year, we have accomplished some major savings and gained efficiencies in procurement through automation and streamlining proce-

dures and we have initiated some major programs in the areas of real property, as identified previously, and safety. An evaluation is planned 4th Quarter FY1994 to determine the extent of the savings realized. We believe we will prove to be a good example to the rest of the Bureau in how to implement reinventing the government in eliminating some unnecessary procedures, generating savings and providing quality customer service.

Know Your Bounds

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Corky Rodine,
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BLM's Eastern States Cadastral Survey exhibit for the Summit emphasized promoting *Interagency Collaboration for Boundary Management*- Why do all these agencies and the public need Cadastral Survey? It's simple, you cannot manage the land, its cultural, biological, mineral, or any other resources without knowing what you own, and where it is. What is the value of land if its location is unknown? Hard to tell, right?

The original Public Land surveys that allowed rapid and peaceful settlement of this country were performed many years ago and require specialized experience and knowledge to find, re-establish, and perpetuate. Cadastral Survey works with many Federal agencies, Native American Tribes, and local agencies providing this expertise.

Cadastral Survey Automation Cadastral Survey has over 200 years of history applying practical innovation and getting the job done. Automation links tradition to tomorrow by adapting technology to improve productivity. Examples range from the development of the solar compass and transit, the tools that surveyed the west, to the first use of word processing, E-mail and today hand-held computers in the field.

This tradition today through the development of many new technologies. These include:
GPS Global Positioning System, for survey & resource applications.

Inertial Inertial Surveying: high productivity positioning.

Current developments are focused on automation of data handling which provide enhanced capabilities using state of the art analysis systems. This development is directed

Figure 1. Photo of display.

Figure 2. Display photo

towards applications that are not provided by commercial vendors, and designed to increase productivity by reducing time in post-processing and redundant data handling.

This development is being accomplished by combining internal expertise in cooperation with academic expertise. This has been accomplished through a cooperative agreement with the University of Maine. This process has been highly successful and has been used in development of the Cadastral Electronic Field Book (CEFB), Cadastral Measurement Management (CMM), and Geographic Measurement Management (GMM) systems. This technology is shared with the private sector and other government agencies. The process involves innovation through rapid prototyping, extensive user testing and feedback, and user support through Bulletin Board and Electronic Mail systems. Recently developed systems include:

Cadastral Electronic Field Book- A field survey data collection system conforming to the requirements of the boundary retracement surveyor. CEFB is based on generic MS-DOS handheld or portable PC technology, and operates with various survey instruments in use within the BLM. CEFB has the powerful capability to collect descriptive data as well as measurements, and incorporates full field-based geodetic computations and an instant readout on current position relative to line and destination.

Cadastral Measurement Management- is a PC based software system designed to fulfill the unique needs and requirements of the Cadastral Surveyor in the BLM. CMM combines powerful data analysis tools, including state-of-the-art least squares analysis, and blunder detection tools, with special Cadastral corner restoration methods. Outputs are in place to export final data to the Cadastral Automated Plat Drafting System, and to the Geographic Coordinate Data Base. CMM has been distributed to the public through the National Society of Professional Surveyors.

Cadastral Automated Plat Drafting- This system was developed from the base of off-the-shelf Autocad enhanced with custom routines and menus. The system has been in full production throughout Cadastral since 1987. The current version provides full geodetic computations and specialized automated riparian median line computations as well as specialed protraction computations.

Geographic Measurement Management- This software was developed for the Geographic Coordinate Data Base (GCDB) Project. This Project, which is currently collecting data in the Western States, is in support of the BLM's developing Land Information System. GMM provides improved GCDB data collection software building upon CMM capabilities. GMM has been adopted as the GCDB Operations and Maintenance software. It generates geographically defined spatial parcels from record survey data, as well as providing statistical data reliability assessments for the data.

Summary:- Cadastral Survey is alive and well today, cognizant of its rich past and tradition, and with a strong vision to the future. These are shown daily by: maintaining expertise, in helping customers of all kinds, knowing where the land is with defendable certainty, and continuing to apply new technology, and developing new spatial products for the information age.

Livestock Grazing: Fishery Concerns and Recommended Actions

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At the request of the Society for Range Management, BLM Idaho in cooperation with the Idaho Chapter of the American Fishery Society developed a three section poster display to illustrate proper riparian management.

The main theme of the display was that livestock grazing and healthy riparian/fishery habitat are not mutually exclusive when improved grazing strategies are incorporated into the management of these areas of critical fish and wildlife concern. Grazing strategies illustrated in the display as having high compatibility with stream/riparian habitats included: riparian pastures; spring grazing (early season use); winter grazing; rest-rotation with seasonal preference; and corridor fencing. A rest or closure strategy may be necessary initially as a treatment for highly degraded riparian/fishery habitats until they return to health (i.e. proper functioning condition) at which time one of the above light intensity grazing strategies can be reinstated.

The poster display depicts a series of before and after photographs of a variety of riparian/fishery habitats from across the State following implementation of one or more of these preferred grazing strategies.

Critical habitat factors for resident salmonids (in particular fish stocks in decline—Snake River Chinook, Sockeye Salmon, and Bonneville Cutthroat Trout) are presented along with existing fishery trends, impacts from grazing and proposed utilization standards designed to alleviate grazing impacts. Methods for monitoring fishery habitat conditions are also displayed.

Monroe Mountain Livestock/ Big Game Demonstration Area

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Monroe Mountain was selected as a "National Demonstration Area", in 1993, by a workgroup called "Seeking Common Ground". This workgroup resulted from the highly successful Big Game/Livestock Symposium, held in Sparks, NV during September 1991. This workgroup is made up of representatives from 8 national organizations: Bureau of Land Management, USDA Forest Service, International Association of Fish and Wildlife Agencies, American Farm Bureau Federation, National Cattleman's Association, Rocky Mountain Elk Foundation, Wildlife Management Institute and the National Fish and Wildlife Foundation. The 2 goals of these national demonstration areas are to "Improve and manage rangeland resources, in order to enhance the long term benefits for livestock, big game and other multiple uses" and to "Effectively communicate this success".

The Monroe Mountain Demonstration Area is located in south central Utah (Figure 1). It is found within the Sevier River drainage of the Great Basin. The boundary includes 426,639 acres, with 34 percent administered by the Richfield District of the Bureau of Land Management, 36 percent by the Fishlake National Forest and 6 percent by the Utah Division of State Lands and Forestry. The remaining land is owned by private landowners (22%), the Utah Division of Wildlife Resources (1%) and the Piute Indian tribe (1%). Figure 2 is a map showing the Land Onwership.

The demonstration area is a distinctive mountain range located within the Sevier Plateau Region. The boundary encompasses a unique ecological management unit that lends itself to demonstration of ecosystem management principles. The area includes a complete spectrum of summer and winter range, for both livestock and big game. Approximately 3,500 cattle and 5,000 sheep are affected by the demontration area. In addition, there are an estimated 600 to 800 elk, 5,000 to 6,000 deer and 40 to 50 antelope.

There are numerous opportunities to incorporate other wildlife interactions into the demonstration area, especially those related to beaver, game birds and fisheries. The area includes known habitat for the Utah Prairie Dog, Northern goshawk, Bald Eagle and Golden Eagle, all of which are Special Status Species. The Utah Division of Wildlife Resources owns the water rights in several reservoirs. One of

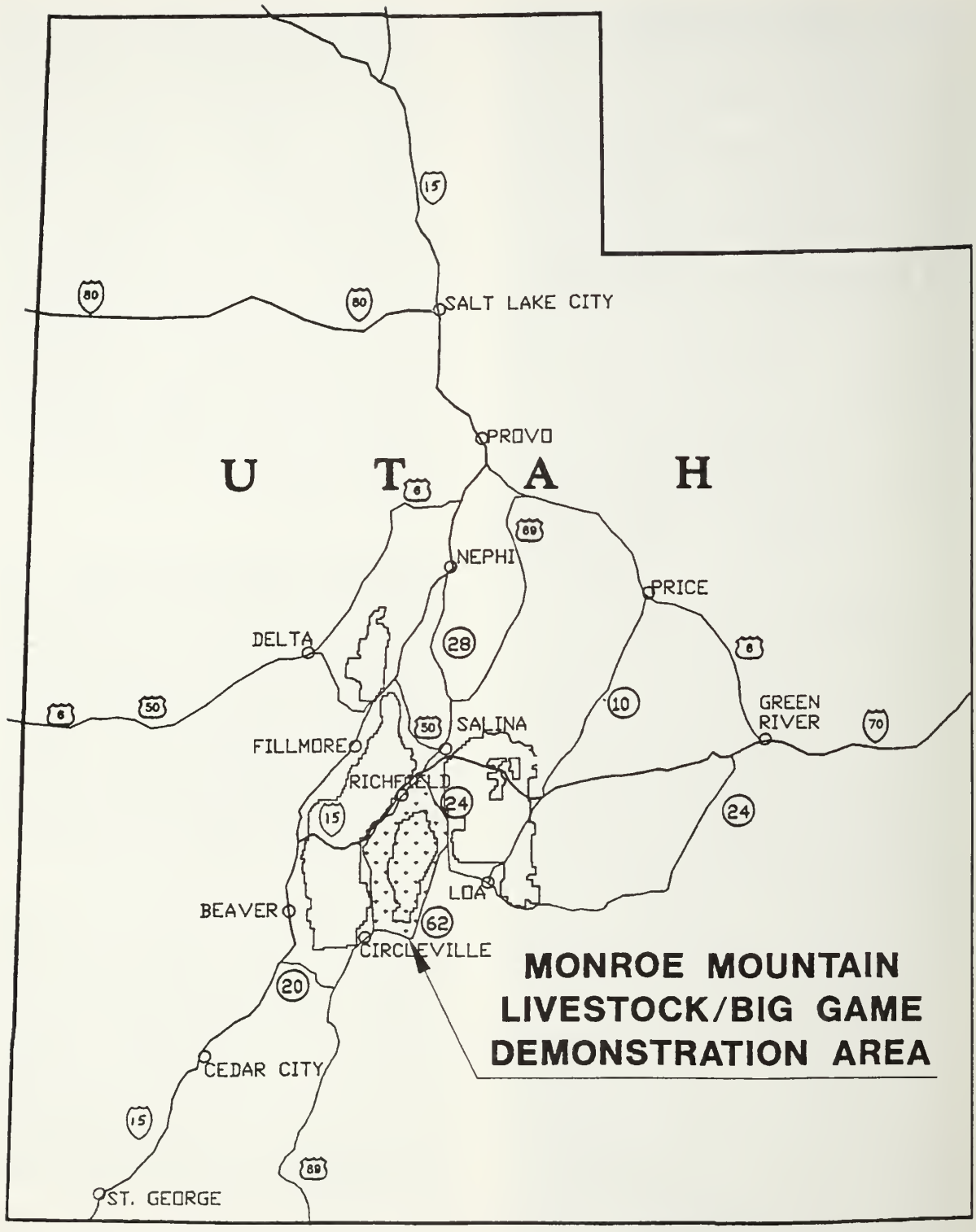

Figure 1. Monroe Mountain location map.

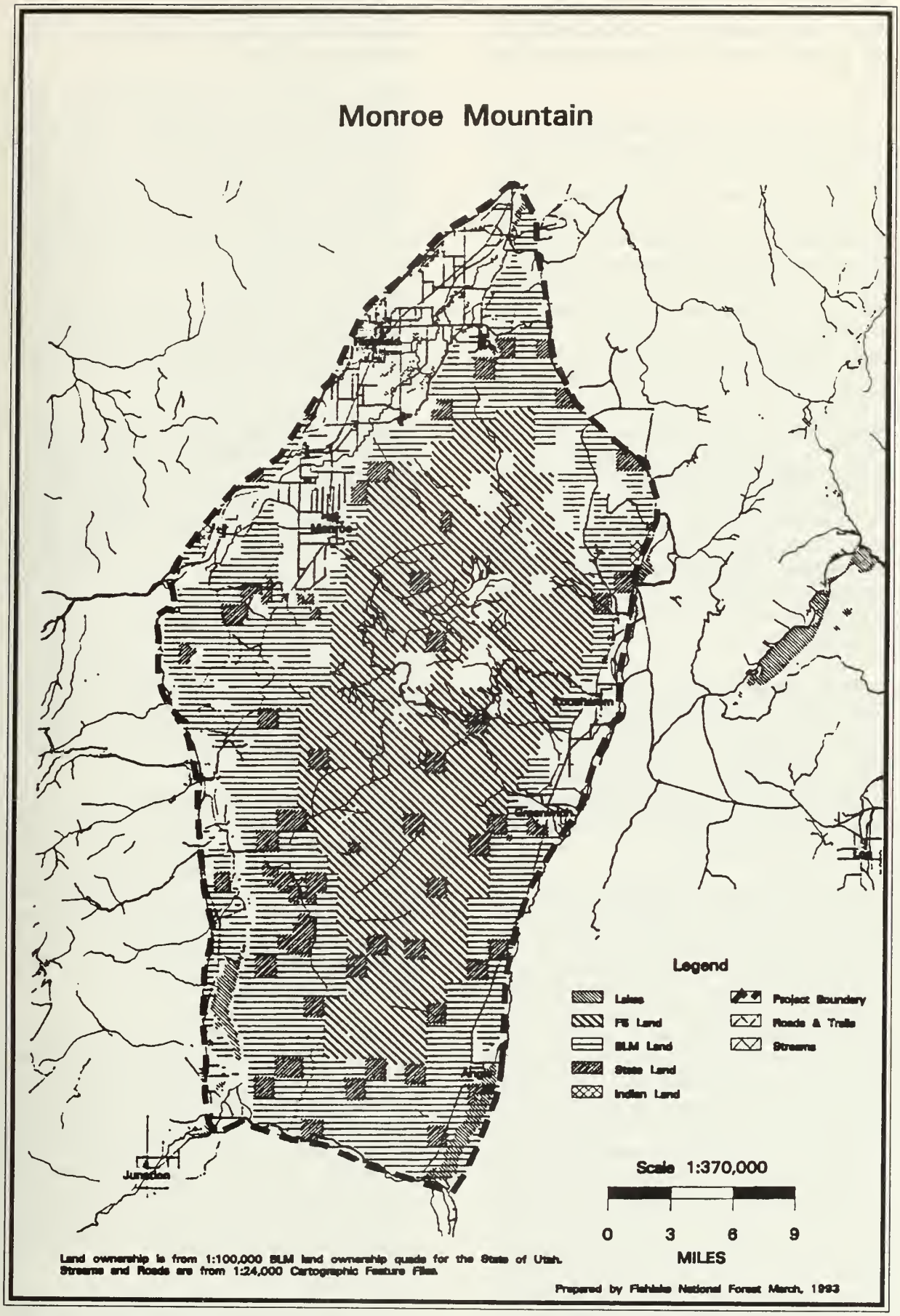

Figure 2. Monroe Mountain land ownership.

these (Manning Meadow Reservoir) is currently being managed for the Bonneville Cutthroat Trout, which is a Special Status fish species.

The selection of Monroe Mountain as a national demonstration area and an Ecosystem Management Project is tied to a strong community awareness and commitment to the development of a management strategy that meets the needs and interests of a wide spectrum of organizations, agencies and people. There are 21 partners involved: BLM, Forest Service, Utah Division of Wildlife Resources (UDWR), State Lands and Forestry, Utah State Department of Agriculture, SCS, EPA, Rocky Mtn. Elk Foundation, Utah State University, Brigham Young University, Intermountain Research Station, Nationwide Forestry Application Group, American Farm Bureau Federation, International Association of Fish and Wildlife Agencies, National Cattlemen's Association, Wildlife Management Institute, National Fish and Wildlife Foundation, National Range Review Team, Private land owners, Piute Indian Tribe, Utah Wildlife Federation and Livestock Grazing Permittees.

After being selected as a national demo area, the program was initiated by the establishment of a "Steering Committee" of the principle land managers and those with special interests, including private landowners. The steering committee has developed a management strategy for the area and coordinates efforts to resolve conflicts.

Several "Advisory Committees" have been established and are made up of representatives of all interested parties. These include wildlife groups, livestock co-ops, recreation/environmental groups, local government and landowners. The advisory committees roles are to provide recommendations to the steering committee, regarding management of the area. Partners and volunteers have joined the project effort as endorsees' of a "Stewardship Management Program". A "Technical Action Committee", comprised of professional agency people, has been established to take on the role of research/project development, coordination and oversight. Research and project results will be integrated into management decisions. The fact that the technical action committee includes research station and university professionals will ensure that the best available scientific information and research is used to meet the goals and objectives of the demonstration area.

Three objectives have been developed with regards to sustaining productivity and diversity: 1) Within five years, improve wildlife food to cover ratios and significantly increase grass, forb and browse diversity and production. 2) Improve the quantity and quality of winter/spring forage, at the UDWR's Elbow Ranch and other key big game areas. 3) Increase forage production for livestock and big game. The overall goal is to enhance the ecological integrity of the area, while providing for human values, products and services within the limits of ecological sustainability.

Both the Steering Committee and the Advisory Committees will be involved in allocating resource values to meet public and land owner needs, while at the same time improving the ecological condition of the demonstration area. One of the major goals is to ensure public and landowner involvement, through various meetings and media sources. To date, a slide program and video have been produced for use in partner recruitment, funding sources, etc. Presentations have been made at several public meetings, livestock permittee workshops, the National Range Review Team and Utah Congressman Hansen's Committee for Resolving Livestock/Big Game Conflicts.

The BLM will be coordinating across administrative and political boundaries, in order to determine desired future conditions. Historic, economic and social sectors are being considered in the evolution of various management plans for the demo area. All proposed actions will go through the NEPA process, in order to minimize and mitigate all short term, long term and irreversible impacts.

Planned actions, improvements and developments will be conducted in a manner that will minimize ecosystem fragmentation and degradation. The effect of management actions, in the demo area, will be considered at the local, state, regional and national levels. Long-term goals have been established. All proposed actions are tied directly to various agency allotment, habitat and multiple-use plans which specify both short-term and long-term goals and objectives.

The Monroe Mountain Demonstration Area

Proposal has been an interdisciplinary/interagency approach from the beginning. This has been facilitated by the fact that Utah manages its big game resource through an interagency system involving BLM, USFS, UDWR, State Lands and Forestry, livestock permittees, public and private landowners. This system involves wildlife, range, watershed and recreation professionals in all of the Agencies. All of the committees are made up of people from various disciplines and expertise.

The fact that the demonstration area covers 430,000 acres (rounded) of land, with varied ownership, will promote the reconnection of isolated tracts of the landscape, which were previously managed in a fragmented manner, by the various agencies/landowners. Professional expertise, from the technical action committee, will incorporate research and monitoring efforts/results into their management activities. Long-term monitoring is included as a component of the Monroe Mountain Demo Area plan.

Muddy Creek Demonstration Area

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The Muddy Creek Demonstration Area is a half-million acre watershed in the upper Colorado River basin of southern Wyoming. The purpose and objective of our exhibit is to demonstrate how people of diverse backgrounds and agendas are working together to achieve the vision they share of proper resource management. Our exhibit illustrates all of the "BLM Summit" themes as follows:

Promoting Collaborative Leadership - A Coordinated Resource Management process is being employed to enable better management decisions in which diversity of viewpoints is sought rather than discouraged. Participants include the Bureau of Land Management, Little Snake River Conservation District, Soil Conservation Service, Wyoming Game and Fish Department, Carbon County Extension Service, Wyoming Outdoor Council, Wyoming Department of Agriculture and Department of Environmental Quality, Carbon County Coalition, private landowners, ranchers, and sportsmen. Worthy of particular note is that over 200,000 acres of private and state land are managed by the same process.

As an example of promoting collaberative leadership. the group seeks public input at meetings and field tours to resolve erosional problems relating to roads and public use of the watershed. This involves technical aspects dealing with culverts, waterbars, and redesign, as well as off road use, creation of new roads, and soliciting improved use ethics by the public.

Serving Current and Future Publics - Emphasis is placed on local participation and ownership in management and long-term sustainability of our natural resources. Education is promoted through local media and exhibits, tours, workshops, and involvement of schools and students in "Natural Resource Days" and on-the-ground projects and monitoring.

One example of this theme is promoting "Adopt-a-stream," such as the Baggs schools did in adopting Loco Creek. Various grade levels help in revegetation, drop-structures, monitoring, and learning about ecological and management processes in a "hands-on," backyard-type setting. Also important is the students' increased awareness of the use and management of the areas adjacent to the stream.

Maintaining Healthy Ecosystems - A watershed approach is used into which all resource values dovetail. Best management practices are being developed and implemented relating to livestock grazing, recreation use, and transportation plans. Two high priorities are to address non-point pollution and restoration of Colorado River cutthroat trout (a candidate threatened and endangered species) into its historic habitat. Monitoring emphasis is on ecosystem function, using water quality, macroinvertebrates, bank water storage, and channel-floodplain relationships, in addition to traditional studies of "key plant" species.

This theme is highlighted by the goal of improving riparian habitat in order to support Colorado River cutthroat trout. Successful reestablishment of this native trout throughout the upper Muddy Creek watershed would almost double the existing stream miles which support this species. Livestock grazing practices are specifically designed to accomplish this objective, using innovative changes in traditional grazing patterns on several livestock operations within the watershed.

Diversifying Our Workforce - Accomplishments on the ground are completed with help from SCA volunteers, Boy Scouts, students, and non-profit organizations. Funding is broad-based with cost-sharing used whenever possible, utilizing 319 (EPA) programs, Great Plains contracts (SCS), habitat enhancement grants, Wyoming Water Development grants, the Fish and Wildlife Foundation, other private "match" money, and local mill levies through the Conservation District.

A recent example of this theme is the reconstruction of the George Dew spreaderdike, a $70,000.00 project funded by eight different participants. It stopped headcuts which were draining a 1,000-acre riparian/wetland complex on the east edge of the Red Desert. The area is used by thousands of resident and migratory wildlife, as well as winter range for livestock which saves a quarter-million dollars annually in supplemental feed costs. In addition, borrow areas were developed for waterfowl brood-rearing ponds and increased wetland habitat.

Improving the Way We Do Business - A part of the "Seeking Common Ground" program, the project has emphasized bringing landowner, land managers, and wildlife interests together for the benefit of all. This approach can continue to yield improvements in land management via broad-based, local involvement in important management decisions.

This theme is exemplified by the current efforts to assess and resolve problems with big game winter ranges. An issue involving public and private lands, work on resolving the problems is sponsored by the WGFD, BLM, and Little Snake River Conservation District to promote best management practices which agencies and private landowners support and have ownership in.

Municipal Sludge Biosolids in Great Basin Mine Reclamation: The Butcher Boy Mine Pilot Study

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Introduction. Waste disposal has been a critical problem throughout human history. As population growth continues, the problem becomes more critical. The United States has led the world in the technology to develop resources. Now it has the opportunity to lead the world in the technology to preserve and manage natural resources. The challenge is to develop new techniques to extract natural resources while protecting our common environment.

Environmental protection and economic growth are not separate challenges. By creative application of management technologies, environmental damage from natural resource development and waste disposal can be limited while enhancing economic development through use of that waste as a resource. Integrated management of waste products and natural resource extraction is a synergistic approach to achieving sustainable growth. One promising technique is suggested by an ongoing mine reclamation research project using *biosolids*, the solid residue of municipal wastewater treatment.

Sludge is the residue removed during the treatment of municipal wastewater and domestic sewage. It is classified as regulated waste because of its trace metals and potential for pathogens. It is not classified as a hazardous waste. Biosolids are those sludges that meet EPA criteria for beneficial use.

Communities have traditionally managed sludge by dumping barge loads into the ocean, lagooning it in lined ponds, and dumping it in sanitary landfills. New regulations for landfills have greatly increased their cost and decreased their availability. Landfills all across the country are filling up far faster than planned. Many are leaching poisonous waste water into local streams and aquifers and the disposal of human waste in existing landfills reduces the already limited public acceptance of planned solid waste disposal sites.

Fortunately other options for sludge disposal are available. These beneficial use projects generally involve land application. They can lead to significant improvements in soil stability and in the structure and diversity of plant and animal communities.

Sludge biosolids are soil conditioners that improve nutrient uptake, increase water re-

tention, permit easier root penetration and improve soil texture. They also contain nitrogen and phosphorus, essential plant nutrients. Municipal sludge biosolids provide both quick release and long term nitrogen. Ammonia and inorganic nitrogen are dissolved in biosolid liquids and are therefore directly available for uptake by plants. Microorganisms provide slow release nitrogen by converting organic nitrogen to a plant usable form. In the west, sludge biosolids are particularly beneficial. Since they provide mulching as well as nutrients, they are less dependent on precipitation for effectiveness than fertilizer alone.

The most significant environmental problem associated with land application of biosolids is the potential for bioaccumulation of metals. High application rates may result in increased plant uptake of heavy metals and contaminate the food chain. Several soil factors regulate plant uptake of metals. Of these, pH is probably the most significant. On western alkaline soils, maintaining soil pH at 6.5 or greater limits the availability of most metals to plants.

Controlled application rates limit the bioaccumulation of metals. The amount of biosolids applied can be balanced with the expected rate of nutrient uptake. Application rates can be adjusted to prevent bioaccumulation by monitoring the composition of the biosolids. State and federal agencies have developed regulations and guidelines for the environmentally safe use of biosolids. Those guidelines apply to biosolids with moderate metal concentrations when the biosolids are applied at agronomic rates based on nitrogen and phosphorus uptake.

There is no existing scientific evidence of significant human health risk from sludge biosolids that are produced and applied to land in compliance with EPA regulations. Also, the weight of scientific evidence supports the conclusion that beneficial use of biosolids that is permitted by EPA does not present a significant risk to the environment.

There are two outputs associated with any mining venture, the minerals extracted and the reclaimed mining site. While major accomplishments in extracting minerals from the Great Basin have occurred, only modest success has been achieved in mineland reclamation. The Great Basin has some of the most difficult lands to revegetate after mining disturbance. Efforts are limited by low precipitation, extreme variation in diurnal temperatures, low relative humidities and severe desiccating winds throughout the growing season. These limitations mean that the availability of suitable growth media is critical. Mine spoil material contains little organic matter, microflora or nitrogen. These shortcomings could be overcome by stockpiling topsoil, if enough was available on site. However, Great Basin soils are often skeletal, with little or no topsoil available. Subsoils with few desirable qualities for plant growth are often substituted. Under these conditions, mining operations often replace natural ecosystems with areas of limited biodiversity and ecosystem productivity.

Study Description.- BLM's Carson City District initiated the Butcher Boy mine pilot project to study the feasibility of enhancing Great Basin mine reclamation with biosolids. The beneficial use of biosolids meets BLM goals to lead the nation in reclamation technology, minimize waste, maximize recycling, foster new technologies and restore healthy ecosystems. The pilot study was a collaborative effort with the Harry Reid Center for Environmental Studies of the University of Nevada, Las Vegas (UNLV), the Truckee Meadows Water Reclamation Facility, American Resources Corporation, Empire Farms and Schuster Trucking.

The pilot study site is located at the Butcher Boy mine, near Wadsworth, about 40 miles northeast of Reno, Nevada (Map 1). The mine operator, American Resources Corporation, prepared the site by recontouring and covering old tailings ponds with mine overburden materials. Through an agreement with UNLV, the Truckee Meadows Water

Reclamation Facility provided the biosolids. These biosolids had been physically separated from the municipal wastewater stream by gravity sedimentation. After processing through clarifiers, they were subjected to an anaerobic digestion process that destroys pathogenic organisms and reduces biodegradable solids. Anaerobic digestion employs microorganisms that convert organic material to methane and carbon dioxide in the absence of air. The biosolids resulting from anaerobic digestion are *relatively* odor and pathogen free. They also have a high fertilizer value, contain-

Figure 1. Location map of study area.

ing 4.8% nitrogen and 4.0% phosphate. Their effectiveness as fertilizer was demonstrated by their use in an alfalfa farming operation at Empire Farms in northern Washoe County, Nevada. Previously, the biosolids were dumped in a landfill, wasting a valuable soil amendment and costly landfill space.

The biosolids were applied to the study site in November, 1992. Schuster Trucking transported the biosolids from the reclamation facility. Empire Farms spread four one-acre test plots with 15 to 30 tons of biosolids per acre. A fifth plot served as the control for the study with no biosolids applied. BLM plowed and seeded all five plots with a mixture of fourwing saltbush, siberian wheatgrass, and crested wheatgrass.

Monitoring. Environmental problems from land application of biosolids can include increases in the trace metal content of groundwater and bioaccumulation of trace metals in plant tissues. Consequently, the pilot study includes a collaborative monitoring program focused on climate, groundwater quality, vegetation density and cover, and trace metal bioaccumulation. During the winter of 1992-1993, BLM monitoring recorded four inches of precipitation, which was 50% above average. This contributed greatly to the preliminary success of the revegetation. American Resources Corporation's water quality monitoring reports have revealed virtually no changes in the trace metal content of the groundwater.

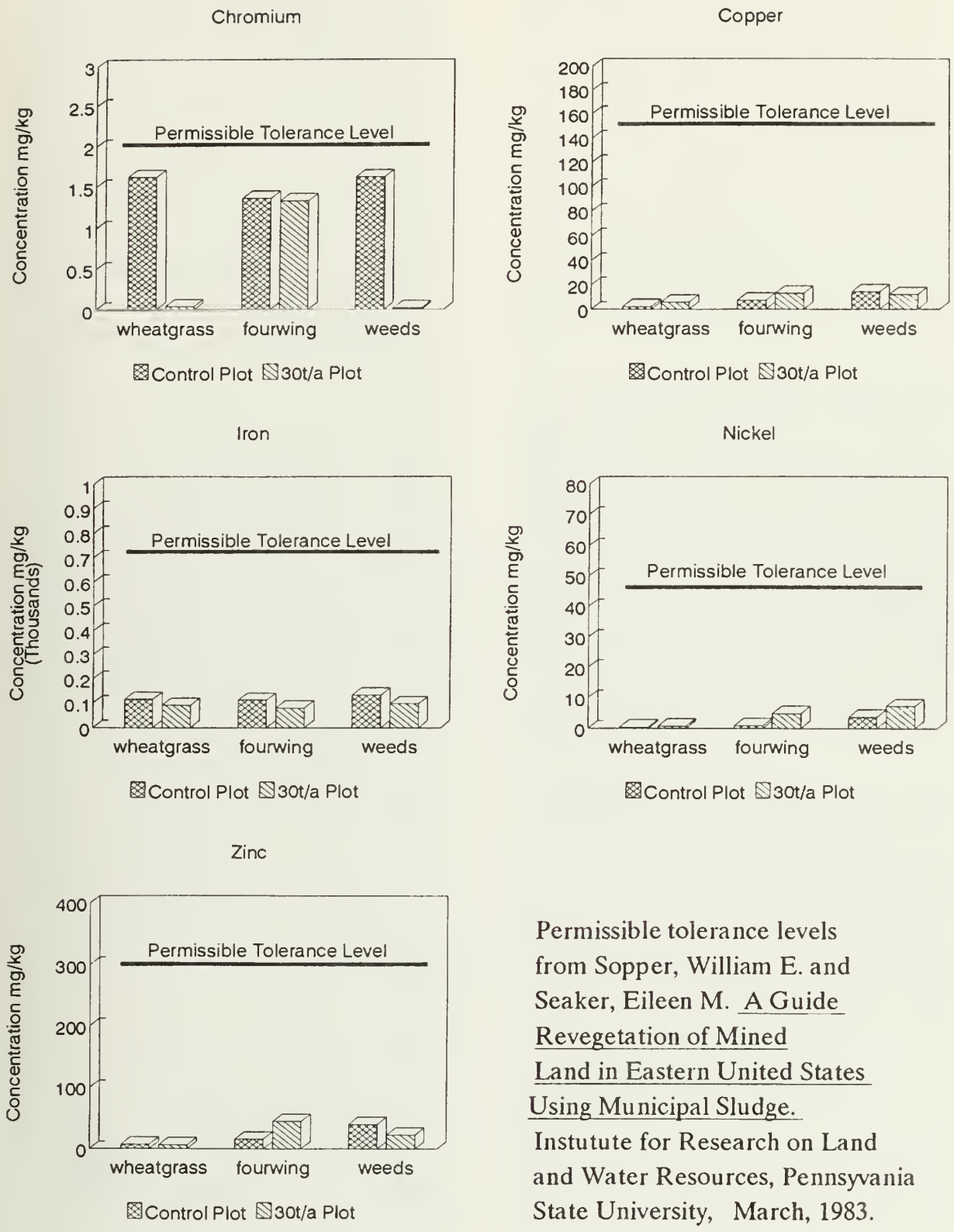
BLM's vegetation monitoring results are encouraging. Seeded shrubs and perennial grasses, as well as volunteer annual grasses and other weeds have become well established. Plant cover ranges from 18% to 51% on the treated plots compared to 6% on the control plot (Photos 1 and 2).

UNLV's plant tissue analysis results indicate that the biosolids were applied at safe levels. Bioaccumulation of metals is within permissible tolerance levels (Figure 1).

Conclusion. Early results from the Butcher Boy mine pilot study indicate that land application of municipal sewage sludge biosolids can help to restore Great Basin ecosystems damaged by mineral extraction. Proper application rates ensured that no degradation of groundwater or unacceptable bioaccumulation of metals occurred. The biosolids have had a significant positive impact on reclaiming the mine. The establishment and substantial growth of both seeded and volunteer species have already increased biodiversity and initiated the establishment of a viable, functioning ecosystem. A key to the success of the study was the collaborative effort among the BLM, academia, municipal government and private industry. Final results from this pilot project will not be available for another four years. However, short term results are positive enough to encourage others to experiment with biosolids. These projects are not only a way to restore healthy ecosystems, but also a way to foster collaborative leadership in recycling a material that can be an environmental and economic burden to local communities.

Photo 1. May, 1994 successful revegetation on biosolid treated plot #3

Photo 2. May, 1994 control plot. This plot was recontoured, plowed and seeded, but no biosolids were applied.



Permissible tolerance levels from Sopper, William E. and Seaker, Eileen M. A Guide Revegetation of Mined Land in Eastern United States Using Municipal Sludge. Instutute for Research on Land and Water Resources, Pennsyvania State University, March, 1983.

Figure 1. Plant Tissue Analysis Results.

Noxious Weed Management in the Greater Yellowstone Area - A Study in Cooperative Management

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In the last 10 years Dalmatian toadflax has become a serious problem on the Southfork of the Shoshone River in northwestern Wyoming. It began as a small isolated infestation of less than three acres and has now exploded to almost 1000 acres in the drainage. It is threatening critical wildlife wintering areas, particularly the Big Horn Sheep winter range on the upper Southfork. At present Dalmatian toadflax can be found from the wilderness area to the lower end of the drainage near Buffalo Bill Reservoir. Dalmatian toadflax is not a native plant to this area. Its impact to the existing vegetation and the ecological condition of the area can be disastrous. Adverse cumulative effects on native plant communities are probable.

Life History And Ecology Of Dalmatian Toadflax- Dalmatian toadflax is a short-lived perennial herb adapted to cool, semiarid climate and coarse-textured soils in North America. It is native to the Mediterranean region from Yugoslavia to Iran. Because of its attractive, bright yellow flowers, it was cultivated in Europe in the late 1500's. It is still grown as an ornamental in various parts of the world, and it was probably introduced as such into North America by the early 1900's. According to Robocker (2), 1974, Dalmatian toadflax was first collected in the United States in the San Gabriel Mountains in southern California in 1920.

Seedlings of Dalmatian toadflax do not compete effectively for soil moisture with established perennial and quickly maturing winter annuals. Thus, Dalmatian toadflax seldom becomes established in closed communities but occurs most often in disturbed soils and depleted rangelands. However, the competitive ability of established Dalmatian toadflax renders it a serious weed where it is well adapted. Alex reported its distribution into very diverse habitats, especially in coarse-textured soils. The area of infestation in Canada, particularly in Alberta, Saskatchewan, and Manitoba, have cold winters. The tolerance of low temperatures and coarse-textured soils apparently helps extend the range of Dalmatian toadflax southward along the mountainous areas and high plateaus of the western U.S.

Robocker reports the average life of a plant is about 3 years. The life of a stand varies and depends on the interactions of the plant's

growth habits with environmental factors. A stand may disappear within 3 years under severe competition, but development of floral stems from secondary crown points on lateral roots may prolong or sustain the stand beyond the life of the original plants. Yearly extension of lateral roots and production of floral stems from these roots, together with survival of new seedlings, allows the stand to persist indefinitely in areas of low competition from other plants.

Established Dalmatian toadflax may be extremely competitive. It can exert a profound effect on the yearly composition of annual vegetation, the production of other perennial herbs, and even its own survival. It is a serious, often variable and unpredictable weed on depleted rangelands and sparsely vegetated soils. It has become established in varying degrees with pasture, range, and roadside vegetation.

South Fork Weed Management Area- In 1992 the Southfork Weed Management Area was formed by a group of landowners and government agencies to address the Dalmatian toadflax problem in the drainage of the Southfork of the Shoshone River. (Figure 1.) The weed management steering committee includes Bureau of Land Management, Shoshone National Forest, Bureau of Reclamation, Soil Conservation Service, Park County Weed and Pest District, Wyoming Game and Fish Department, Park County Conservation District, National Park Service, State Lands Department, University of Wyoming Cooperative Extension Service, and private land owners and managers. The long-term goal of the group is to reduce the level of Dalmatian toadflax infestation within the weed management area. The short-term goals are to: 1) contain Dalmatian toadflax with the current boundaries, 2) inventory and map the current boundaries of Dalmatian toadflax, 3) Determine effective Dalmatian toadflax control methods, and 4) develop awareness and educate the public about the Dalmatian toadflax problem.

Inventory- An inventory is one of the most useful parts of the noxious weed management program. A good inventory and mapping system clearly defines the problems. It conveys awareness both visually and statistically. The inventory that is being developed for the South Fork Weed Management Area addresses vegetation, site characteristics, and history for the area. It gives a total picture of the weed problem, not just one or two small areas that have a problem. Mapping provides an historical weed infestation record that can easily monitor the expanding weed problem and the success of a weed control program. (Figure 2)

The Park County Weed and Pest District has the responsibility for doing the ground inventory work for this management area. The inventory results are being reported to the Bureau which has the responsibility to track of the acres infested with noxious weed and undesirable plants by species, density and location. It is the BLM's intent to provide land and aquatic resource inventories that are compatible among all agencies in an effort to identify and classify noxious weeds and noxious weed infestations. The inventory data is being automated thru BLM's geographic information system (GIS). The BLM's GIS capability currently exceeds that of other groups or agencies involved in management of the area. As information is incorporated, such features as topography, ownership, roads, trails, powerlines, irrigation canals and ditch systems can be displayed. It is important to have such information as jurisdictional boundaries, vegetation types, soils and groundwater available.

Sharing this information among government agencies, landowners and managers is a very important aspect to the overall management. Several ways have been developed to share this automated information with other agencies GIS programs. The Park County Weed and Pest District and other members of the Weed Management Area Steering Committee use a personal computer based system which will accept information from the Bureau's. Once the data is captured and automated all of the members of the steering committee have access to it to help with their individual management decisions. It becomes a very powerful tool in the cooperation that is needed to successfully manage the weed infestation.

The current approach for inventory and data management in the South Fork Weed Management Area is leading to an increased awareness of the slow explosion of weeds. The maps that are being produced from this automation effort are a very valuable tools for education of the public. The graphic presen-

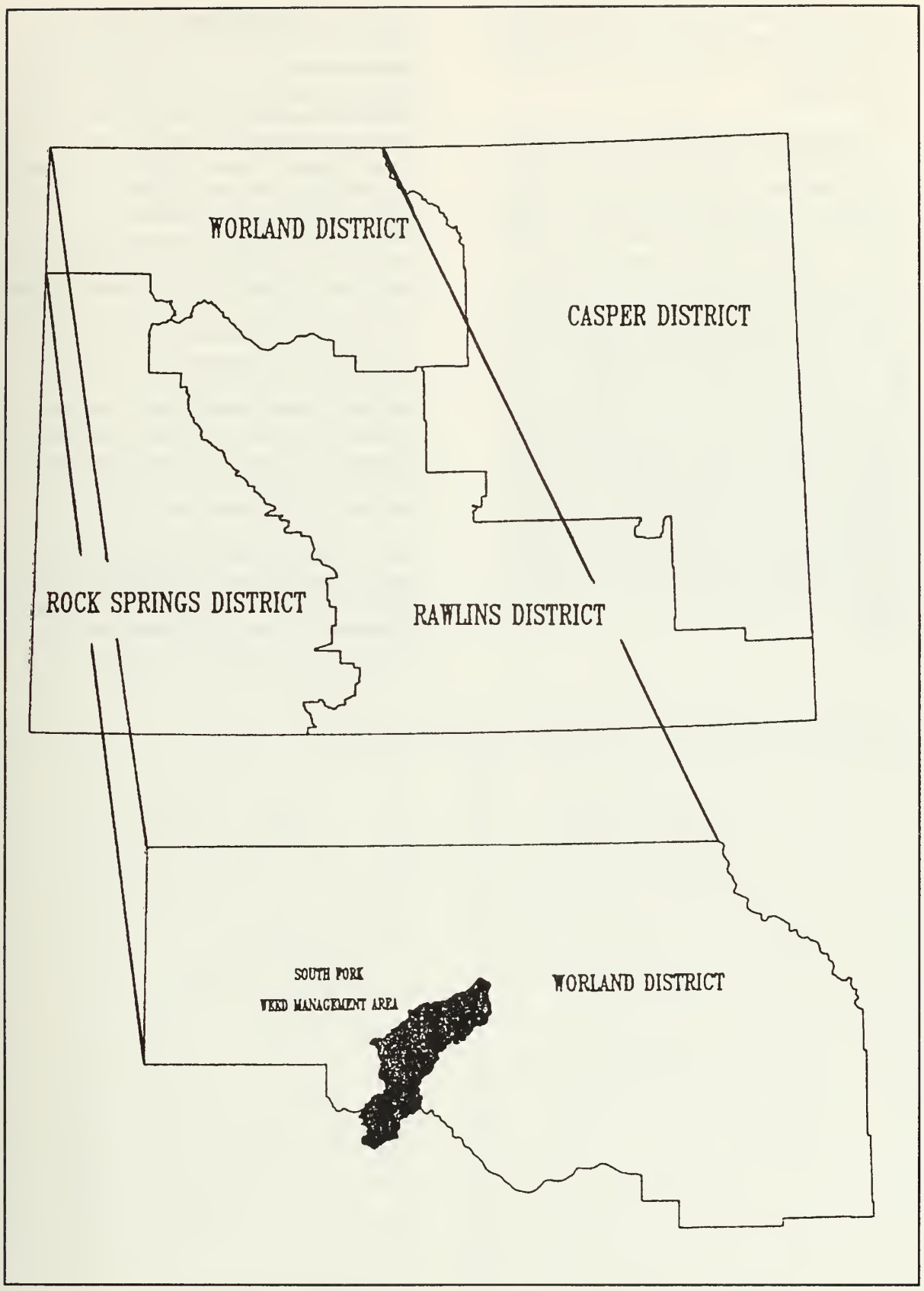

Figure 1. Location Map of the South Fork Weed Management Area in Northwestern Wyoming. This special management area covers over 400,000 acres of the drainage of the South Fork of the Shoshone River.

tation of the encroachment of noxious weeds is one of the best tools that the land manager has in efforts to get all parties involved in weed management.

Present Control Efforts- It is the intent of the South Fork Weed Management Steering Committee to implement integrated pest management approaches to confine or reduce the rate of spread and to control this noxious weed. Integrated weed management is a proven method to reduce weed populations to acceptable levels of economic and ecological consequences. The integrated system of management includes cultural, physical, biological and chemical control methods. To date most of the control efforts have been physical and chemical. The possibility of some competition studies is being investigated. The Agricultural Research Service hopes to be able to introduce some biological control agents within the next two years. Present control efforts will continue to try to reduce the rate of spread. At this point in time eradication of Dalmatian Toadflax from this area is not likely.

Future Management Direction- It is anticipated that the Bureau will continue to coordinate and store the inventory information for this management area. New ways of sharing this information are being developed. It is hoped that most of the federal agencies will be using similar system in the future. Having the ability to interface with systems that the county and state governments use will be a tremendous advantage to the management of noxious weeds. Reporting weed infestations by species and infestation level on a minimum of three years will provide information needed to document the trends in noxious weed infestations, their economic impact, and long-term assessment of treatment needs. Keeping track of the number of acres placed under management will provide annual accomplishments, strengthen cooperative actions, and improve the efficiency and effectiveness of noxious weed management.

Summary- Improving the way we do business is the major theme of this project. It identifies success that have occurred as the result of cooperation between the various federal,

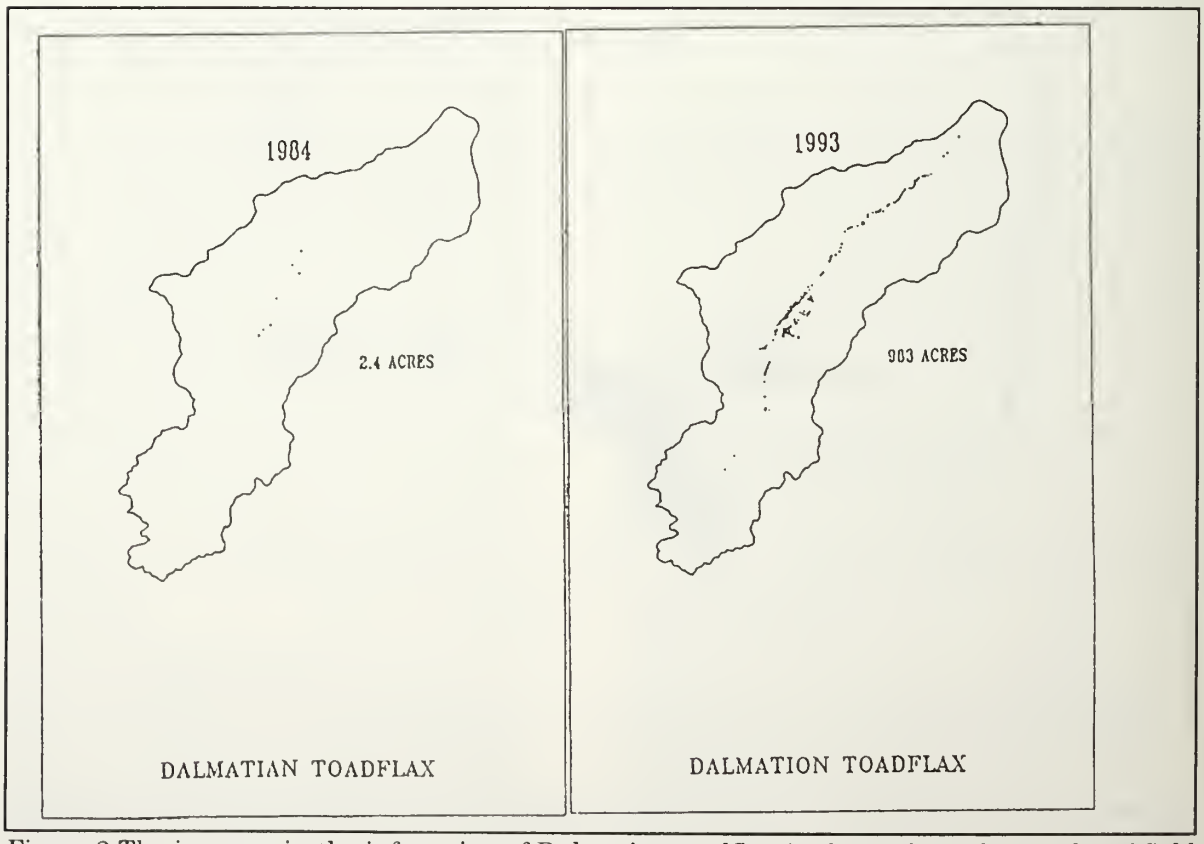

Figure 2.The increase in the infestation of Dalmatian toadflax is shown from the results of field mapping done in 1984 as compared to the inventory that was done in 1993.

state and county agencies as well as private landowners. Education of BLM managers and staffs, public land users and general publics is much easier with a good inventory of the noxious weeds. Noxious weeds are an ecosystem wide concern and impact the quality and quantity of all renewable resources. Coordinated noxious weed management within logical established areas provide the best strategy to achieve management objectives and fully incorporate integrated pest management principles. Early detection and prevention efforts are the best way to minimize the spread of noxious weeds.

The BLM is vitally interested in an integrated pest management approach to the control and management of noxious weeds. The BLM has and shall continue to remain active in developing, demonstrating, and applying the essential science, technology, and stewardship necessary to effectively manage and prevent the spread and infestation of noxious weeds. The BLM's historic role has been reactive. By entering into cooperative weed control programs the BLM will be participating in actions which will improve the quality and ecological conditions of all the land.

New Perspectives on Heritage Education

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BLM's national Heritage Education Program, located at the Anasazi Heritage Center, focuses on educating children and creating products that teachers and archaeologists can use in the classroom to raise young people's appreciation of cultural resources. By instilling in them a desire to preserve and protect these precious resources, the Bureau is better able to fulfill its stewardship mandate.

The Anasazi Heritage Center is BLM's premier archaeological museum, research center, and curation facility. Heritage Center programs provide an introduction to Four Corners prehistory, archaeological methods, and an opportunity to participate in organized hands-on exercises that teach archaeological basics and the value of our cultural heritage. The Heritage Center's temporary exhibits and guest speakers explore broader aspects of life in the Four Corners—including the land; wildlife; plants; and lifestyles of the Indian, Spanish, and Anglo cultures.

The poster session demonstrates how the "BLM Summit" themes are an important part of the national Heritage Education and regional Anasazi Heritage Center initiatives. The initiatives are keyed to the Summit themes numerically:

1. promoting collaborative leadership
2. serving current and future publics
3. maintaining healthy ecosystems
4. diversifying our work force
5. improving the way we do business.

Heritage Education partnerships between BLM field offices and outside entities produce student handbooks, implement Project Archaeology, and provide resources to local teachers for conducting teacher workshops. Partners include the National Park Service, U.S. Forest Service, National Science Teachers' Association, and other state and local agencies, as well as local school districts. (1,2)

Healthy ecosystems include cultural properties and reflect cultural impacts. Heritage Education Program activities demonstrate how the study of archaeology can inform us about past ecosystems and their relationship to the present. (3)

Project Archaeology exercises are specifically aimed at current teachers and their students, the future public. (2)

The Anasazi Heritage Center receives about 40,000 national and international visitors a year, including 5,000 students and teachers from the Four Corners states. All visitors have an opportunity to grind corn, weave on a loom, use microscopes to look at the tiny traces of resources used by Native Americans 1,000 years ago, learn about the Anasazi in interactive computer programs, and handle artifacts in the Discovery Drawers. (2,5)

Photo 1. Heritage Education Programs help children learn about BLM.

An Anasazi Heritage Center-Fort Lewis College Heritage Education partnership sponsors Native American interns in developing interpretive products for use in classrooms, universities and interpretive centers and provides practical experience in interpretive methods. (1,2,4,5)

The Anasazi Heritage Center and the Heritage Education Program are public outreach initiatives that educate people about the BLM and its cultural resources. They are proactive efforts that reach out to all generations. (2,5)

Photo 2. Touching is believing! Our heritage belongs to us and to our children.

ANASAZI HERITAGE CENTER

ANASAZI HERITAGE EDUCATION PROGRAM

LOGOS

Showcase Content
Banner: New Perspectives on Heritage Education

M = Summit theme
P = photo
L = label text
B = bound booklet
T = text panel

M1 Workforce Diversity
M2 Collaboration and Partnerships
M3 Cultural Resources in Ecosystems
M4 Doing Better Business
M5 Serving the Public

T1 The Anasazi Heritage Center is the BLM's premier archaeological museum, research center, and curation facility.

Every year over 40,000 visitors come to learn about ancient cultures and modern archaeology. Hands-on experiences teach the value of our cultural heritage.

Almost 5,000 school children visit annually. The AHC provides teacher guides, lesson plans, artifact loan kits, videos and other tools to excite students' appreciation of cultural resources.

The AHC also hosts traveling exhibits and expert speakers on the broader Four Corners experience—the landscape; wildlife and plants; and the past and present cultures of our Indian, Hispanic and Anglo neighbors.

P1/L1 The Anasazi Heritage Center and Escalante Ruin teach cultural resource values to travelers and school groups.

P2 Hands-on microscope exhibit redesigned for wheelchair accessibility.

L2 Interactive archaeology exhibits make our heritage fully accessible to everyone.

T2 Why does BLM have a Heritage Education Program? There are approximately 5 million cultural properties on BLM's 270 million acres of public lands.

BLM's Heritage Education Program teaches children the need to preserve and protect these irreplaceable cultural resources.

Today's children are tomorrow's citizens. Together we will steward the land.

P3 Discovery drawers allow visitors to touch and examine artifacts.

L3 Touching is believing! Our heritage belongs to us and to our children.

P4 "Don't let the Past become History" bookmarks w/ preservation messages and 1-800 number to report archaeological vandalism.

L4 Heritage Education Outreach programs help children learn about BLM.

P5 AHC Interpretive Specialist with Tesuque Pueblo intern.

L5 The First American internships program promises workforce diversity, thanks to a collaborative partnership between the BLM and Fort Lewis College, Colorado.

P6 Historic photo of Ute children in traditional dress.

P7 Modern Ute beadwork: vest, tie, gloves, purse, & belt pouch.

L6 Native American history exhibits highlight our past and present multicultural heritage.

P8 Intrigue of the Past activity guide cover.

L8 Project Archaeology is a comprehensive education program for current teachers and their students, our future public.

P9 Boy Scouts with their finished rock art drawings.

P11 Rock art drawing exercise with preservation messages and information about rock art.

L9A "INTRIGUE OF THE PAST: A Teacher's Activity Guide for Fourth Through Seventh Grades" available to teachers through BLM's Project Archaeology workshops, is a set of 28 comprehensive lessons on archaeology.

L9B Past ecosystems can be studied through archaeology in "Pollen Analysis"—Lesson 13 of "INTRIGUE OF THE PAST: A Teacher's Activity Guide for Fourth through Seventh Grades."

B1 National Science Teacher's Association reprint of "The Hupobi Heritage Project" from Science and Children magazine.

B2 Lesson Plan from "INTRIGUE OF THE PAST: A Teacher's Activity Guide for Fourth through Seventh Grades," the BLM's Project Archaeology workbook.

P10 Poster.

L10 The National Science Teacher's Association's Science and Children magazine featured a poster and an article about our Santa Fe Indian School partnership project, linking past and present environments.

P12 Santa Fe Indian School students at work on their multi-media project.

L11 A Heritage Education Partnership with the Santa Fe Indian school enabled students to create and interactive multi-media program that is now housed at the Ghost Ranch Interpretive Center in New Mexico.

T3 BLM's Heritage Education Program

Partners promote collaborative leadership and improve the way we do business. A few partners are:

Santa Fe Indian School
Fort Lewis College, Colorado
Museum of the Rockies, Montana
Bringham Young University, Utah
Wisconsin Dept. of Natural Resources
U.S. Bureau of Mines
Forest Education Foundation
National Park Service
National Science Teachers Association
Teenage Mutant Ninja Turtles
USDA Forest Service

P13 Students examine General Land Office records at the Eastern States Office.

L13 Hands on learning helps students appreciate the importance of leaving artifacts in place.

P14 Dankworth Village Activity Guide.

L14 Dankworth Ponds Outdoor Learning Center is a BLM partnership in southeastern Arizona that teaches students about cultural resources as they explore this prehistoric pithouse.

P15 Student plastering a Dankworth Village pithouse.

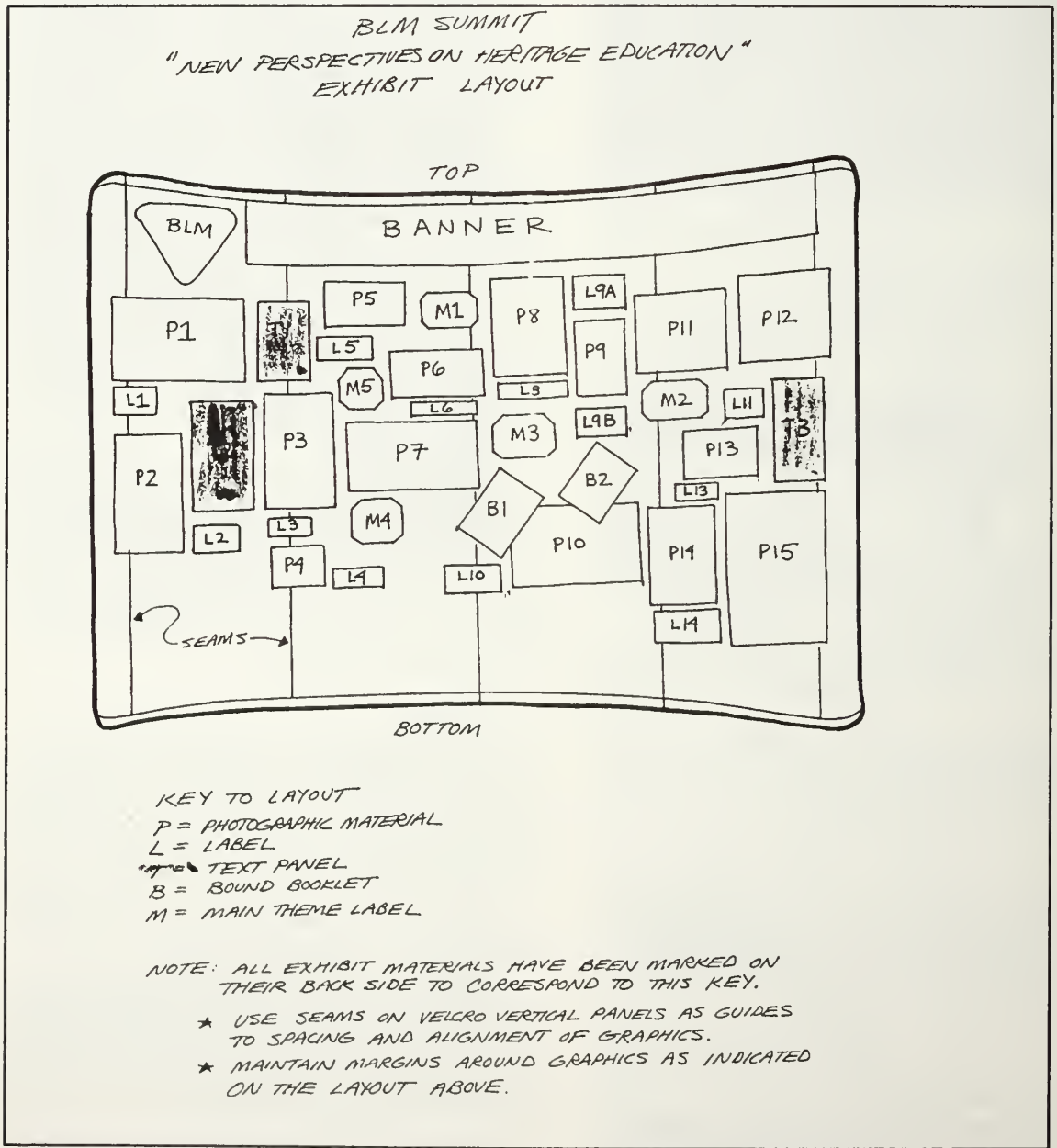

Figure 1. Display layout.

The Nevada Mining Claims Imaging System

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As technology improved to remove micron sized gold from the earth at a profit the number of mining claims filed in Nevada dramatically increased. With the mining claim recordation unit already struggling with keeping up with about 35,000 new mining claims being filed each year along with other associated paperwork, this additional workload added to the growing backlog of cases to be processed. In the summer of 1988 American Management Systems was asked to evaluate the mining claim recordation section and recommend a solution to the backlog. Their recommendation was to use imaging technology.

In the Spring of 1989 the Nevada State Office submitted an amended Five-year Plan for an imaging system which received approval. The Nevada State Office was allocated $917,184 in subactivity 4990 to obtain optical imaging technology. A request for proposals (RFP) was prepared in May of 1989 and after evaluation a contract was awarded in January 1990. The total number of mining claims at that time was about 400,000.

From February 1990 through July 1991 workflow and system software were designed to meet the job of processing mining claims and the system was accepted. In August 1991 all new mining claims were being scanned onto optical disk. All mining claims filed since that time are being scanned onto optical disk. At the same time a contractor is scanning the active mining claims in existence as of August 1991.

To date 122,130 separate documents associated with 307,834 distinct mining claims have been scanned onto optical disk. All documents associated with 97,203 mining claims are now on the Nevada mining claims imaging system. By the end of the fiscal year another 25,000 mining claims with all associated documents will be on the system plus an additional 3,000 documents associated with mining claims already on the system.

The use of this technology has vastly improved the way we have managed large volumes of public documents submitted by mining claimants. The public is better served by the efficiency in processing new mining claims and the availability of that information even as the case is being adjudicated in the workflow process. It is the workflow process which differentiates this system from the Gen-

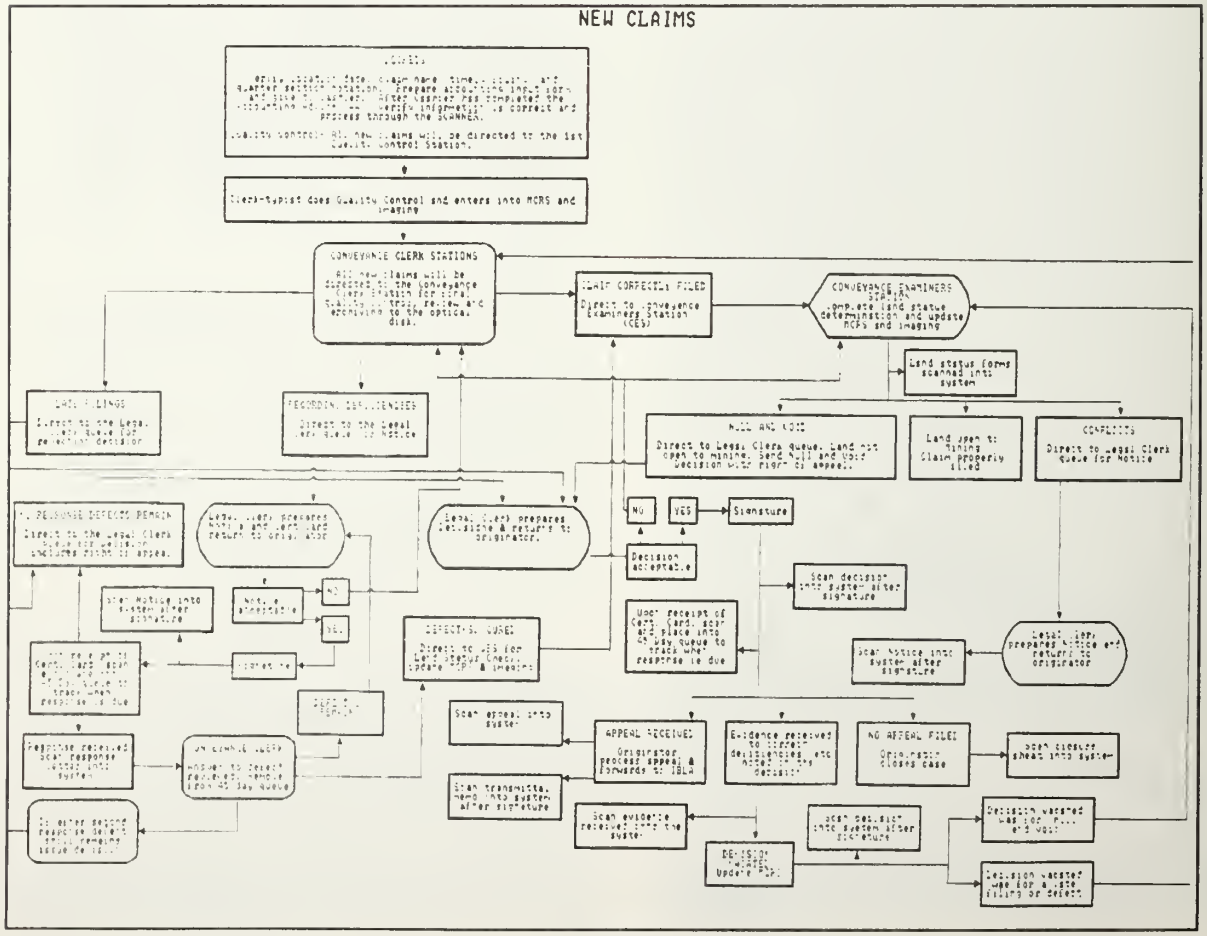
eral Land Office (GLO) Records Project under taken by the Eastern States Office. Both projects use imaging technology but for different applications. The GLO Project is centered on storage and retrieval only. The Nevada Mining Claims Imaging Project uses storage and retrieval capabilities of imaging technology as well as a workflow process whereby the mining claim image is routed through a network for adjudication by the appropriate personnel. An example of one of these workflows is shown in Figure 1.

As soon as the mining claim location documents are scanned into the system they are available for the public to view on a terminal located in the Public Room. Before the use of imaging technology a mining claims casefile contents were not available until after all adjudication had been completed. By having real time access to the mining claims on the imaging system you can determine the latest locations of mining claims without waiting for the mining claim recordation system (MCRS) to be updated or for the quarterly microfiche to come out.

By automating the system using imaging technology, personnel in the public room who had to spend time pulling casefiles and making copies can better serve the public doing other tasks. Any mining claim document scanned into the system including large size documents can be printed from the terminal located in the public room. This allows the public to review the documents and select what they want copies of and send the request direct to a printer thereby giving them quicker more efficient service.

Another benefit of the system is security. No one may remove any documents from a mining claim file on the system and documents can not be altered. This protects the rights of the mining claimant from loss or sabotage. Copies of the optical disks are stored offsite which further protects against loss from any disaster such as fire or flood.

Current access to the system is limited to a terminal located in the Nevada State Office public room. In the future we hope to have remote access from District and Resource Area Offices with the potential for dial-up access from anywhere.


NEW CLAIMS
CONVEYANCE CLERK STATIONS
Clerk-typist does Quality Control and enters into MCRS and imaging
Land status forms scanned into system
Scan decision into system after signature
Scan notice into system after signature
Scan appeal into system
Scan transmittal memo into system after signature
Scan evidence received into the system
Scan decision into system after signature
Decision vacated
Decision vacated

Partners in Flight

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The San Pedro Riparian National Conservation Area received special designation from Congress in 1988. As the nation's first riparian national conservation area, the NCA is managed in a way that protects, conserves, and enhances its unique riparian values. When the Bureau of Land Management acquired the property through a land exchange in 1986, biologists began inventorying wildlife populations to determine the status of sensitive species.

In 1990, Partners in Flight began to unite international agencies in an effort to protect the declining neotropical migratory bird population. Approximately 250 avian species have been identified as neotropical migratory birds by Partners in Flight. The majority of these species occur within the San Pedro Riparian National Conservation Area. With the quantity and quality of avian life history data already gathered on the NCA, BLM was in a unique position to take a leading role in the effort.

The Bureau of Land Management showcases its commitment to the Partners in Flight program within the NCA through collaborative leadership in the international Partners in Flight program. The NCA has compiled the largest avian inventory and monitoring program in the Bureau. The monitoring program provides the basis for BLM's *Nongame Migratory Bird Habitat Conservation National Strategy Plan*. The data has provided accurate and detailed information on avian population dynamics and habitat preferences, life history requirements, and habitat needs for a variety of sensitive species. BLM has shared this information with private organizations, state, and federal agencies across the United States and Latin America. As a continuing lead member of Partners in Flight, the NCA continues to establish new partnerships that promote conservation programs for migratory bird species. The shared information will provide participants with an example of riparian habitat management that benefits neotropical migratory birds.

Public education is another way BLM participates in the Partners in Flight program. Southeastern Arizona was recently voted the most popular place for bird watchers in the United States. The great diversity of avian life attracts an estimated 30,000 visitors each year to the San Pedro Riparian National Conser-

Table 1. The following table represents neotropical migratory bird population response since BLM's San Pedro Riparian National Conservation Area in southeast Arizona prohibited grazing in the riparian habitat. Densities are number of individuals per 4,000 acres of habitat.

Species	Year						% Change
	86	87	88	89	90	91	
Yellow-billed cuckoo	6	10	8	8	13	*	+120
Western wood-pewee	8	16	22	38	28	29	+260
Brown-crested flycatcher	21	33	27	36	26	26	+24
Bell's vireo	7	11	7	12	15	16	+129
Yellow warbler	29	84	99	227	131	176	+607
Common yellowthroat	7	24	39	115	110	149	+2030
Yellow-breasted chat	26	44	47	95	100	110	+323
Summer tanager	44	84	73	167	94	108	+145
Song sparrow	0	11	14	38	36	61	+6100
Northern oriole	28	35	28	34	21	32	+14

* Represents data not availlable

vation Area. Staff specialists provide current information on habitat requirements for many sensitive or listed avian species. The 1995 national meeting of the American Birding Association will be held in Sierra Vista, Ariz., and San Pedro will be a primary attraction for all of the participants. During another annual event, the Southwest Wings Birding Festival, NCA staff provide support, lead tours, and instruct participants. Promoting the value of nongame bird species and their habitats as an irreplaceable element of America's natural heritage is an integral part of the overall NCA effort for Partners in Flight. Keeping land owners and visitors informed ensures quality resource management will continue in future generations.

Healthy ecosystems are the cornerstone of the NCA effort with Partners in Flight. Avian biologists have conducted research to restore, maintain, and enhance populations of nongame birds through a variety of habitat management practices. The avian monitoring program, which has observed avian species continuously for seven years, has documented more than 350 bird species using the NCA for breeding, wintering, or migration, making it the most diverse in the interior United States. NCA biologists have enhanced the habitat, attempting to stabilize sensitive avian populations. Through the monitoring program, BLM has documented tremendous increases in populations of riparian species that depend on the low-lying vegetation to survive. The song sparrow and common yellowthroat have increased more than 2000 percent each (Table 1).

When BLM first acquired the San Pedro National Conservation Area, only nine pair of gray hawks were nesting in the area. Through holistic land management practices, that number has since increased to an estimated 25 pair in 1994, nearly 50 percent of the United States' population of gray hawks. The knowledge gained from these efforts has helped managers make sound, ecosystem-based decisions, and provided the foundation for proactive management of neotropical migratory birds.

Even more encouraging than local habitat management techniques has been the cooperative nature in which the Bureau has participated with other public and private organizations to manage the entire San Pedro watershed as one ecosystem. Cooperative information sharing between all land managers in the San Pedro Basin will continue to ensure sound land management practices both for the present and for the future.

This showcase focuses on several of the Summit themes. **Promoting collaborative leadership** is one of the strongest elements of the San Pedro Riparian National Conservation Area (NCA) efforts in the international Partners In Flight program. As the flagship program in the Bureau's Non-Game Migratory Bird Habitat Conservation National Strategy Plan, the NCA has initiated the largest avian data collection program in the Bureau. Avian

population dynamics and habitat preferences have given Bureau management accurate and detailed information on life history requirements and habitat needs of a great variety of sensitive avian species. This information has been shared with private organizations, and state and federal agencies across the United States and Latin America. The NCA continues to establish new partnerships which promote conservation programs for migratory bird species. Active participation as a leading member of the international Partners In Flight - Aves de las Americas program will continue, and the information dispersed will provide neotropical migratory birds to all partnerships.

Serving current and future publics takes place on a daily basis as NCA staff specialists provide information ion habitat requirements of many sensitive or listed avian species to public and private landowners throughout the West. This allows for wise management of resources both present and future generations. Public education which promotes the value of nongame bird species and their habitats as an irreplaceable element of our natural heritage is an integral portion of the overall NCA effort for Partners In Flight.

Maintaining healthy ecosystems is the cornerstone of the NCA effort with Partners In Flight. Knowledge gained has helped managers make resource decisions in holistic manner, providing the foundation for proactive management for the benefit of neotropical migratory birds. The NCA staff has conducted research to restore, maintain, enhance, and conserve populations of nongame birds through a variety of habitat management practices.

Partnerships For America's National Historic Trails

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Many partnerships helped the Bureau of Land Management draw attention of the public to the remarkable remaining ruts, swales and historic vistas of the National Historic Trails found on public lands in 1993. The partnerships are continuing and will allow countless visitors to experience the natural setting through which emigrants passed in the mid 19th Century.

The 1993 Oregon Trail Sesquicentennial celebrations and observances were an outstanding success in drawing tourists to trail sites and associated features in Wyoming, Oregon, and Idaho. In Wyoming, the State Division of Tourism estimated a 22-26 percent increase in visitation to the state, during a season when visitation declines were noted at Yellowstone and Grand Teton National Parks.

Partnerships- A variety of partnerships were formed in Wyoming, Idaho and Oregon. These contributed to a tremendous increase in the awareness of National Historic Trails on public lands. The Bureau of Land Management worked closely with state divisions of tourism, private landowners, convention and visitor bureaus, chambers of commerce, a variety of non-profit organizations, and the commercial and educational news media. By using the marketing expertise and contacts of the tourism divisions, BLM was able to highlight the availability of trail segments and associated features on public lands where access was not a major concern.

The Future- The forthcoming celebrations of the Mormon Pioneer trek in 1996-97; the California (Applegate) trail sesquicentennial in 1996; the California trail sesquicentennial in 1999 and other landmark events on other designated trails provide BLM with a special opportunity to plan for and capitalize on ways to educate visitors about the role of public lands today.

This will enable BLM to continue to promote collaborative leadership; serve current and future publics, show how healthy ecosystems can be maintained to preserve remaining trail resources; and improve the way we do business. The Bureau will also be able to reach a diversified audience since the use of the emigrant trails cut across many ethnic groups.

Tourism Trends Match Trails- The national historic trails on public lands adminis-

tered by BLM exemplify new opportunities for rural economic development and enhanced tourism/recreation on public lands. Several trends reported by state tourism offices lead to a significant opportunity for BLM to reach new audiences. These trends are described below:

—The "graying" of America. Tourists in their 50s and beyond are seeking resource-related experiences. They are shunning the amusement park experiences in favor of natural settings.

—Sustainable Tourism. Visitors of all ages want to see places that are natural but which will not be damaged by increased visitation or by installation of minimal accommodations...as long as the natural setting is not damaged.

—Participatory Tourism. Visitors want to experience a hike on a trail segment; see costumed interpretation as long as history is accurately portrayed; visiting Native American celebrations; and, visiting Mountain Man encampments.

—Cultural Heritage Tourism. This trend fits into BLMs mission like a hand in a glove. Apart from designated National Historic Trails, BLM offers the visitor outstanding cultural resource sites. We also offer opportunities to see regionally-significant trails and related historic sites such as are found on the Bridger and Bozeman trails. And, our paleontological resources offer partnership possibilities to make available "digs" and special sites where pre-historic animal remains are visible.

International Tourism. Foreign visitors are discovering the public lands in ever-increasing numbers. The Oregon Trail Sesquicentennial drew thousands of visitors from some three dozen foreign nations in 1993 to Wyoming alone. Through the marketing efforts of consortiums of state tourism divisions, BLM attractions are portrayed to visitors in Europe and Asia. These visitors are also seeking natural and historic attractions, especially those that are part of the "old West".

A Special Partnership- The Wyoming showcase exhibit featured a special partnership with the National Historic Trails Foundation, Inc., the City of Casper and the State of Wyoming and the Bureau of Land management. The partnership was formed in 1992 in order to build a National Historic Trails Center in Casper, Wyoming. This collaborative effort will see the Foundation provide $4.5 million to construct and install exhibits and maintain them and to provide funds to help defray operating costs of the center. BLM will construct and operate the center with assistance from the partners. The Wyoming Legislature, in 1994, appropriated $700,000 in funds to be matched by non-State money by the Foundation. Additional funding sources are highly probable in order to divide long-range costs among more partners.

The Center has widespread support across the State since it is seen as a magnet that will become a tourist destination. The site is already on one of the major tourist routes to Yellowstone and Grand Teton national parks.

Strategies For The Future. Our strategic planning efforts need to recognize the opportunities and potential impacts of dramatically increased tourism related to trails and other historic and cultural resources. Visitor centers will become tourist destinations; Back Country Byways will become an integral part of our recreation and cultural heritage programs; wayside exhibits with multi-lingual interpretive panels need to be prepared; a variety of maps and brochures must be envisioned; trained service personnel can make the tourist's experiences worthwhile; and, more unpaid staff will provide visitor services. Other examples of our long-range planning needs include selection of sites and routes to be designated as part of an overall tourism effort.

Seeking Partnerships-. Hundreds of partnerships already exist in BLM. More are needed as budget and personnel constraints no longer allow us to be insular. Many individuals and organizations are willing to assist in providing cooperative funding for projects; providing historic research; installing exhibits; and even providing volunteer staffing for centers and other locations. State tourism agencies and local groups such as Chambers of Commerce and convention and visitor bureaus are ready to help us help them in economic development activities related to tourism.

Railroad Valley Wetlands Enhancement

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On May 2, 1934, Executive Order 6697 established the Railroad Valley Migratory Bird Refuge with the U. S. Fish and Wildlife Service (USFWS) administering the area until 1950. During that time, the USFWS drilled several artesian wells to fill the 53,000 acre dry lake bed. This objective was not met, but aquatic habitat was created in natural depressions near the well sites. Some dike construction was performed, as well. In 1950, control of the area was transferred to the Nevada Department of Fish and Game (NDF&G). NDF&G constructed additional dikes and spillways to further increase waterfowl and shorebird habitat. In 1968, a Public Land Order was issued which required a cooperative agreement between NDF&G and the Bureau of Land Management (BLM) covering management of the area (now the Railroad Valley Wildlife Management Area (WMA)). Currently, the BLM Tonopah Resource Area (TRA) is assuming primary responsibility for the maintenance and enhancement of this valuable wetland ecosystem.

The WMA is regularly utilized by more than 100 bird species. Common waterfowl species include Canada geese (*Branta canadensis*), mallard (*Anas platyrhynchos*), pintail (*Anas acuta*), cinnamon teal (*Anas cyanoptera*) and redhead (*Aythya americana*). Many common shorebirds utilize the area. Additionally, western snowy plovers (*Charadrius alexandrinus nivosus*) and white-faced ibis (*Plegadis chichi*), candidate (C2) species for listing under the Endangered Species Act, regularly occur in the WMA. Although not occurring in the immediate project area, the threatened Railroad Valley springfish (*Crenichthys nevadae*) also occurs in the RRV WMA.

Despite the area's importance to these many species, the remoteness of the area and funding constraints prevented the accomplishment of any significant work or maintenance. Consequently, the dikes, spillways and water control system deteriorated to the point of nonfunctionality. That is, until FY 1993 when the first challenge cost-share cooperative agreement between Ducks Unlimited, Inc. (DU) and the Nevada BLM was entered into by the Battle Mountain District (BMDO) TRA and DU Western Region. In addition, a third party, Round Mountain Gold Company (RMGC), volunteered materials and labor for a small enhancement project at the Big Well area of the RRV WMA.

The RRV WMA consists of four separate areas: Locke's Ponds, Big Well, Chimney Springs and Blue Eagle Ponds. To date, cost-share work with DU has been aerial photos and the replacement and maintenance of pre-existing structures at Big Well and Locke's Ponds.

At Big Well, a 3000 foot conveyance ditch was rechanneled. This ditch conveys water from an artesian well (Big Well) to the first water control structure and dike. This water control structure, as well as, a second lower control structure were replaced due to frost heave and corrosion damage.

Likewise, two water control structures also were replaced at Locke's Ponds. These, too, were damaged by frost action and corrosion. In addition, a breached levee was repaired and two spillways were replaced. At both Big Well and Locke's, water levels are higher in 1994 than in 1993 despite the tremendous spring runoff experienced in 1993. The net result of our current efforts are larger ponds and more available habitat for waterfowl and shorebirds, with less available water.

Several goose nesting platforms were removed at both sites. These platforms were used by geese in years past, but had fallen into a state of disrepair and no use had been noted since the early 1980's. It was decided to be more economical and efficient to remove and replace them with platforms requiring less maintenance.

In cooperation with RMGC, potholes were blasted at Big Well. Using blasting materials and labor supplied by RMGC, several small potholes were created. Other than BLM employee costs, this enhancement project was completed at no monetary cost to the government.

The potholes blasted were of various surface area and range from three to eight feet deep. This enhancement project resulted in approximately 1 acre of new ponds for dabbling ducks. Several potholes have been blasted in this area in the past and dabbling ducks use them frequently. Mallards also use them as nesting and brood rearing sites. Nesting frequency should increase with the addition of these new ponds.

Future work with DU will include excavation of additional ponds in the Big Well area. There are four other wells in this vicinity and the water is currently flowing out into shallow depressions in adjacent playas. They are very shallow and evaporation all but dries them up in the summer. By deepening these depressions, yearlong ponds for waterfowl nesting and brood rearing will be created. Additional dike repairs will be conducted in all areas needed and water control structures will be replaced at Blue Eagle Ponds. Additional pothole blasting, in cooperation with RMGC, is a possibility at the Big Well site.

Obviously, cooperating with private industry and conservation groups is a better way of doing business. The combined work of DU and RMGC has, for FY 93 and FY 94, resulted in a savings to the government of almost $30,000 ($25,200 DU and $4500 RMGC). This is 50% of the total cost. And there are other benefits, as well. Expertise, such as wetland engineering (DU) and blasting (RMGC), may not be readily available to the BLM (particularly in remote locations such as TRA), but come as part of the deal in cooperative ventures. Additionally, streamlining of processes can occur. For instance, DU agreed to be responsible for contract development and administration, thereby avoiding the "red tape" involved in BLM contracting procedures.

These cooperative efforts are serving our current and future publics. Use of public lands is ever increasing and diversifying. Recreationists are demanding increased and improved recreational opportunities. Without the work done by the BLM, DU and RMGC, this wetland ecosystem would have eventually deteriorated to the point of non-existence. By providing habitat for sensitive species, waterfowl, shorebirds and their associated predators, we are ensuring current and future publics a recreational opportunity to hunt and view species that would not otherwise exist in central Nevada.

We are also serving our publics by maintaining a healthy wetland ecosystem. It is well known that, despite the no net loss of wetlands policy, wetland areas in the United States are still dwindling. Wetland areas are particularly important to Nevada. Areas suitable for waterfowl and shorebirds are few and far between, especially in central Nevada. As demands for water and human populations grow,

the importance of small, isolated wetlands such as this will increase exponentially. By maintaining and enhancing this small but important wetland area, we are helping to ensure vital habitat for future wildlife and human populations.

Cooperative efforts such as this are the future for the BLM and other government agencies. By involving the public, everyone wins. The BLM accomplishes objectives that otherwise may not be monetarily possible or at the very least may take years longer without outside help. In this case, the public gains through enhanced recreational opportunities. Cooperative ventures are also good public relations for the BLM. By getting private entities involved, there is an increased awareness and understanding as to what the BLM is trying to accomplish. This, in turn, can foster goodwill between the agency and the publics it serves. This, indeed, will benefit everyone.

Recreation 2000: Update

The use of a collaborative process to sharpen the focus on the implementation of Recreation 2000: A Strategic Plan.

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The Bureau of Land Management (BLM) introduced the Recreation 2000 initiative in 1989, and produced a strategic plan which has guided public land recreation management. This strategy initiated a new way of thinking regarding the BLM's recreation program.

We in BLM embraced this strategy, along with many of our partners. During the first five years of implementation, we have successfully completed numerous efforts to move us from a "background player" into the forefront of many aspects of recreation management.

Recently, we have been confronted by new challenges and opportunities. Our greatest challenge has been to continue to meet existing and future public recreation demands with no increases in federal appropriations. Our opportunities arise from the new way we will be conducting our business under the tenets of ecosystem management and the less restrictive work environment resulting from implementation of the National Performance Review recommendations.

The "Update" is an addendum to *Recreation 2000: A Strategic Plan* and the companion Implementation Plan. Its purpose is not to replace these documents, but to narrow the scope and focus the implementation of the strategic plan. The Update provides a new vision and parameters to help us progress under the ecosystem management philosophy. The intent is to establish the vision and parameters through the Update document, and then build the action plan from the bottom up based on your thoughts and those of others both inside and outside the Bureau. Subsequent documents will address specific implementation actions.

Although the Update brings in many new ideas and new ways of accomplishing our recreation management goals, the intent is not to provide direction aimed at "doing more with less," but rather to capitalize on our successes and to work "smarter, not harder." The strategy recognizes that each state, district, resource area and landscape unit has its own unique attributes, and that the Bureau can play a vital role as a recreation provider within each of these areas. However, in order to continue our success, we must focus on the things we can do best --- our niche.

THE PROCESS- Faced with increasing pressure to provide outdoor recreation despite

a declining workforce and limited budgets, the BLM decided to use a collaborative process to refocus the Recreation 2000 implementation priorities. This was accomplished through the organization and work of three teams.

1) A BLM Core Team that provided leadership and staff Assistance;

2) A BLM Overview Team that provided overall direction for the effort; and

3) A Stakeholders Team representing a variety of national interests.

The BLM Overview team met first to brainstorm a list of issues and to frame some ideas and questions for the Stakeholders Team. The Stakeholders not only provided excellent response to the issues, but had much more to offer as well. Following the first two sessions, the BLM Core Team developed a draft report which was subsequently reviewed and improved in follow up sessions with the Overview and Stakeholders Teams.

The overwhelming response from the stakeholders was surprise and satisfaction with the extent their contributions were captured in the report. They also provided additional guidance to improve the document even further.

A field review draft was circulated to all BLM offices for further review and comment for use in preparing a final product. Delivery of the final Updated strategy will incorporate measures to assure knowledge of its availability and support for its use. Internal communications and contacts with external groups will continue to focus attention on the Update and how it can be used to improve BLM's capability to provide quality recreation opportunities.

There is no question this process has been enhanced by the collaborative effort between BLM and external constituents. Moreover, through this sincere effort with external groups, BLM has gained recognition and support as a quality recreation provider.

Overriding Parameters

1. **Ecosystem management and the call for sustainable natural, cultural, social, and economic systems**. Our commitment to ecosystem management will fundamentally change the way we conduct our management activities. This new management emphasis has significant implications for recreation management as we move towards a holistic management emphasis with a focus on riparian areas and natural and cultural boundaries, and the maintenance of sustainable natural, cultural, social, and economic systems. We will move away from programmatic activity and towards product and project oriented team-based management actions. This shift in management emphasis to an "ecosystem" based approach, including sustainable development, will mandate greater collaborative effort in both planning and management at all levels of the organization and with our publics and partners.

2. **BLM's recreation niche as a recreation provider.** We will emphasize *resource-dependent* recreation opportunities that are characterized by wide open spaces reminiscent of the Old West --- maintaining the spirit of the Western Frontier. We will actively manage our lands under a philosophy that gives the public freedom to choose how to spend leisure time on BLM managed lands within the constraints of sound ecosystem management.

   Our focus will be on back country adventure type experiences, but we will also respond to demands for high intensity development and use where necessary. Even where intensive development is required, facilities will serve primarily as staging areas to accommodate resource–dependent recreation activities.

   We will provide public land visitors with high quality, sustainable recreation experiences by working closely with other providers/delivery partners to determine the specific recreation niche that we should assume for each landscape unit in the delivery of the desired experiences and opportunities.

3. **A quest for quality.** We will place renewed emphasis on excellence, using ecosystem management principles to achieve quality recreation opportunities. This quality emphasis includes the goal of attaining universal accessibility in recreation sites, facilities, and programs.

Guiding Principles. Three guiding principles will direct planning and decision making. The precise application must occur on a specific landscape unit basis where we work with other recreation providers and land managers to define a local/regional niche to provide sustainable recreation experience opportunities.

Guiding Principle #1- Serving current and future publics (public service). We will endeavor to "touch," in some positive way, every visitor who comes to public lands. This may be done by personal agency contact through agency employees and/or volunteers; contact through an outfitter, guide, or concessionaire permitted by BLM; or through written or graphic materials made available to the visitors. We will provide customer service that is equal to the "best in the business" for the niche we have selected. In cooperation with our delivery partners, we will get the essential information to our target audience and will provide them with the information they need to make informed choices in the selection of recreation opportunities on BLM lands.

The goals of this principle will be accomplished by:

- Providing sustainable, quality recreation experience opportunities;
- Sharing in the marketing of recreation opportunities with our provider/delivery partners
- Providing quality service to our customers, the visitors to public lands;
- Responding to the needs of our diverse public (racial, ethnic, cultural, accessibility, etc.) within the parameters provided by our recreation niche;
- Providing quality recreation facilities which incorporate universal design features to ensure access to all Americans; and
- Sharing the responsibility with our provider/delivery partners for:
- obtaining and exchanging information on the needs and demands of our customers; and
- getting information to our visitors.

Guiding Principle #2- Promoting collaborative leadership and shared responsibility. We encourage partnerships; shared management responsibilities; and complementary management goals with other federal, state, and private land managers, local communities, and other interested parties. We will work with all interested and affected parties to develop management strategies that provide for social and economic well-being and safeguard ecosystem health.

The goals of this principle will be accomplished by:

- Expanding and strengthening partnerships to ensure an efficient delivery of recreation experience opportunities;
- Sharing in tourism partnerships to ensure sustainable natural, cultural, social, and economic systems and more efficiently and effectively meeting visitor needs;
- Sharing management responsibilities for developed sites and other areas of special recreation importance including joint management;
- Sharing in the planning, development, and operation of major capital improvement projects such as visitor centers within the parameters provided by our recreation niche.

Guiding Principle #3: Improving the way we do business- We are entering a new era in public lands management which requires a new kind of leadership. We need to demonstrate through our actions that we are committed to our recreation visitors and to healthy ecosystems. We must aggressively reach out to our recreation provider/delivery partners to ensure an efficient and effective delivery system under a shared arrangement. We must build and sustain ownership in constituency groups by involving them through collaborative efforts in the decision making process.

The goals of this principle will be accomplished by:

- Leading by example. Managers at all levels must be proactive in providing leadership to implement improved business practices;
- Rewarding managers, technical specialists, and other employees who demonstrate commitment to ecosystem management and the delivery of quality recreation opportunities to the public;

- Acting as a catalyst to bring together partners, promote collaborative management, and building ownership and commitment;
- Seeking-out and empowering "Champions" and "Master Performers" -- those

people who are recognized experts and have unique skills needed throughout the BLM;
- Providing regular and continuous training for all BLM personnel who are directly or indirectly involved in delivery of recreation opportunities, to keep them up with the latest trends, techniques, and skills;
- Creating opportunities to work with traditional users to encourage them to work cooperatively with the recreation users to facilitate responsible use of public lands.
- Pursuing national level options such as: national public lands passes; national foundations; lease/purchase arrangements for capital improvements; national corporate sponsors; easing restrictions on Golden Eagle passes to make them applicable to more areas; and working with OMB and Congress for greater return of collected fees;
- Establishing a more aggressive program at the state level to access other federal, state, and private funding sources;
- Exploring partnership options for increasing funding through fee collection and the use of alternative funding sources;
- Making better use of cost sharing opportunities to do priority BLM projects;
- Exploring opportunities for getting traditional users to support specific projects such as interpretive displays;
- Having users pay for information through ticketron or other similar options.

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The Significance of Geographic Technologies in Implementing the BLM's Mission of Ecosystem Management

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Geographic analyses, or "spatial analyses" have been done manually for a couple thousand years (yes thousands, read Ptolemy, Strabo, and Hipparchus—who formulated the use of latitude and longitude). But, spatial analyses have often been afterthoughts to merely map (spatially document) decisions.

Currently, the automated (computerized) tools of spatial analyses are the "geographic technologies," which include, but are not limited to: Geographic Information Systems (GIS), satellite remote sensing, and Global Positioning Systems. One of these tools, a GIS, is a system that brings these and other technologies together in usable form. A GIS is a tool to actualize spatial concepts, it is not an afterthought "electronic map-rack," or even worse, a "gee-whiz" shrine to the future, operated by a few elitists at a remote location. A GIS is a tool for scientific process in land management, that, to be used logically, must be employed as an analysis framework from preplanning through implementation of land management alternatives. In a truly integrated approach to ecosystem management, the "spatial" resource specialist (geographer) must sit at the same "round table" as all the other program specialists.

Logically, to maintain "healthy" ecosystems, and indeed to first identify what parameters and conditions define "healthy," it is crucial to understand, measure, and monitor ecosystem dynamics, interrelationships, and the forces that affect them whether they are contiguous or not. The framework in which this is accomplished must be quantifiable (measurable), repeatable (documented into institutional memory), and trackable (able to be monitored) in a controlled, systematic fashion. After all, ecological change is continuous and inevitable.

These concepts don't mean "losing control" to an unthinking, unfeeling machine. Absolutely no limitations apply to the number of GIS layers that can be derived and modeled for testing of multiple scenarios (multiple alternatives) and multi-temporal datasets (different timeframes, or "snapshots in time"). Original single layers of data "base data" always stay intact and are available for different approaches to modeling. (It's good to remember here that a model is not a slew of mathematical equations that must be memorized. *A model is simply a representation of reality at a certain point in time.)*

GIS handles all the pesky math that comprises geographic analyses and Boolean operations (deductive operations of intersection and symmetric difference). New ideas can be incorporated and tested, and old survey data and methods incorporated. Managers and specialists can thus relate past land conditions and management methods to current and future conditions and management choices.

Even more important, some spatial analyses and scientific knowledge have previously gone unrecognized without the unemotional logic of a GIS. Technology not only improves the way we do business through increased efficiency and confidence in the information used to make decisions, but can help in transferring this confidence to our cooperating agencies and publics.

Spatial (geographic) analyses have and are being used in the BLM Albuquerque District. Ecological responses and conditions have been modeled and related to management alternatives using Biophysical Land Units (BLUs). GIS and BLUs successfully manage the complex administrative/management boundaries and legal mandates that complicate the already convoluted modeling challenges of identifying ecosystem components and dynamics.

So what's a BLU? BLUs are homogeneous, ecological response units derived using a GIS. BLU components are the biological and physical (biophysical) "pieces" of an ecosystem or ecotype. The pieces may include: soils grouped by texture or erodability, geology, terrain features such as a limited elevation range or degrees of aspect or slope, vegetation/
landcover types, and surface water—whatever is pertinent to the geographic location/ region.

For example, in New Mexico, some of the pieces may be conifer stands on steep slopes of volcanic cinders, or open shrubs and forbs on low-slope, highly erodible soils subject to violent storm runoff events. Alternatively, a coastal ecosystem may include pieces like geology, vegetation, water depth in an estuary, or tidal flow dynamics. *In simple terms, BLUs are a graphic representation of ecological responses (condition) combined into a single map layer, and represent the location, extent, and dynamics of multiple ecological components.*

Historically, land managers have described the "existing environment" of regions or administrative units (e.g., wilderness areas, range allotments) by extrapolating from field surveys that cover only small percentages of the ecological components. Conversely, BLUs are delineated through GIS Boolean logic, from a matrix or cross-reference of ecological attributes, without regard to administrative or ownership boundaries—or personal "gut" feelings. GIS, and computers in general, don't care about personal feelings (not yet anyway, except on "Star Trek").

This means that the power of GIS sets no limitations on the number of ecological component layers that can comprise the BLU model matrix, and is *intentionally* exploited to represent hierarchical ecological structure. *The matrix of defined components (e.g., vegetation/landcover, soils, surface water, slope, elevation, and aspect) draws the BLU boundary lines.* Therefore, human perspective (emotions, expectations, values, and visual interpretation) do not predetermine the spatial delineation of BLUs. If an ecotype component combination has not been anticipated in the formulation of the matrix, that spatial area "drops out" of the BLU model. This simply results in a blank space on the map that is revisited by single map layer analysis and field verification of the site. In this way, previously unknown anomalies, ecotypes, ecological responses, or disturbances ("hot spots") may be identified.

Satellite remote sensing data (specfically Landsat Thematic Mapper data) are being used in the BLU model for vegetation/ landcover and surface geology/soils. It is well known that satellite data provide total spatial coverage of a large area in a "snapshot in time." So why not just use satellite data for resource analysis and modeling? Vegetation/ landcover is only the *surficial expression* of "systems". The BLU model incorporates ecological components to get a grip on the underlying *dynamics* of systems.

An initial iteration of "core" BLUs is a matrix combination of: vegetation/landcover, soils, surface hydrology, and terrain characteristics. This initial iteration of BLUs is flexible enough to provide "common ground" resource information to a wide spectrum of resource specialists. Incrementally more detailed BLUs can be tailored for specific ques-

tions or conflict analyses by adding layers of biophysical or cultural information and/or site-specific data. Data collected and geocoded to a particular site might include observed assemblages of flora and fauna, rain gauge or other climatic data, or a particular localized use or management practice.

Why go to all this trouble to model BLUs/ecosystem dynamics? *Ecosystem management requires understanding of dynamic energy exchanges and processes—constantly moving targets.* A GIS never gets tired of repeating the processes at different points in time, or trying a different scenario at the whim of a fickle human being. For instance, to track the rehabilitation of a riparian zone, changes in vegetation/landcover or availability of surface water can be measured and compared to changes in pasture rotation, weather variations, or the relationship of an additional stock and wildlife watering site.

Now, what was that about hierarchical structure? That means flexibility in scale or resolution—the differences between walking the land and seeing the whole ball of wax from space—as well as all the shades of gray in between. Many mapping models or strategies have been two-dimensional. BLUs are not only three-dimensional; when the element of *time,* (those satellite data snapshots-in-time, and/or other historic information) is added, they are *four-dimensional!* This facet of the BLU concept is not meant to establish a totally new perspective, but rather to provide a methodology to link past and present datasets with future predictions. New approaches don't, and shouldn't, start from scratch! Improving methods of relating historic and current environmental data is crucial to identifying past patterns and developing analysis models for predicting change.

A BLU layer can display the first level of analysis—the homogeneous mix of the "core components" of existing environments, to which *other defining layers like administrative boundaries or cultural features can be added for reference, without confusing displayed information beyond the point of recognition and interpretation.* The focus is on spatial patterns, the assemblages of those patterns (reflecting communities), and the ecotones that provide the transition between homogeneous areas. The emphasis is one of dynamics, anomalies, edge conditions, stability, and sustainability—in direct and quantifiable relation to best management practices.

The concepts described in this paper were presented in poster/showcase form at the BLM "Summit" in April 1994. Numerous maps, including pairs of change detection maps, were displayed. Because of space limitations, only two examples are shown here.

A simple, practical example of BLU monitoring in relationship to an established program is BLU change detection referenced to "potential plant communities." A potential plant community is the biotic community that an undisturbed site is capable of supporting, based upon the site's physical characteristics. The following GIS plots show outlines of potential plant communities derived in GIS from soils and terrain data. The red areas depict a comparable BLU. The left plot displays the BLU in a "snapshot in time" in June 1984. The right plot displays the same BLU in June 1988. A change has occurred in the location and size of the BLU, indicating a change in ecological response or condition. A larger portion of the potential has been achieved in 1988, the result of less vehicular travel, good vegetation growth in a wet year, and subsequent reduced grazing pressure.

With BLUs in GIS we can intersect data layers and analyze acres of actual vegetation condition, potential, and what may be "desired" condition. For example, if 1000 acres or 50 percent of a site is occupied by a plant community 1984, and 1500 acres or 75 percent of the site is occupied in 1988, there has been a 25% improvement. The same BLU monitoring concept can be used in relationship to potential, existing, and desired habitats, range sites, or whatever program is of interest. Additionally, all these programs can be compared to each other for conflict analysis. The causes of change can then be analyzed in GIS by overlaying specific "natural" layers and "cultural" layers such as roads, oil and gas wells, or range allotments.

BLUs can also be used to spatially model the extent and composition of ecotypes, and therefore *biodiversity*, by recognizing spatial patterns based on ecological responses. The following simplified example shows how BLUs and GIS can detect the amount, rate (time involved) and direction of change in biodiversity. The plot on the left is BLUs in

1984. The plot on the right is BLUs in 1988. Visual assessment reveals a change in ecological pattern. Remember, these single map layers are BLUs—not just vegetation, and measurements and program analyses like those in the previous example can be done.

If those examples intrigue, hold on to your hat. Current modeling for the Upper Rio Puerco Watershed includes parallel and relational analyses of BLUs and the Revised Universal Soil Loss Equation (RUSLE). The RUSLE model is being used in a tabular database, and BLUs are being modeled separately. The BLUs are then being compared with RUSLE results, and being used as originally intended—for dynamic evaluation and monitoring of the health (condition) of ecosystem energies and their response to management alternatives.

A lot more science underlies BLUs and a GIS than can be easily expressed in a few pages. The bottom line is providing land/ecosystem managers with practical information for day-to-day decisions. Many data sources are going unused, simply in need of a frame of reference. GIS and satellite remote sensing can provide such a framework.

The BLM is already using them in Albuquerque, analyzing such things as: forage allocations for wildlife and livestock grazing, where to build trails or expect recreation impacts, and how to control erosion in the notorious Upper Rio Puerco Watershed. And, work is underway to expand the four-dimensional concept of BLUs to a global scale to accomplish "global change monitoring" spatially.

Sound like big dreams? You bet, but it *works*. All that is required is the desire to think and model spatially—not just in two dimensions, but in three or four dimensions. The main idea is to get away from the electronic map rack mentality and allow geographic technologies to be USED.

Squirrel River Integrated Activity Plan Kobuk District, Alaska

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Introduction- Above the Arctic Circle in northwest Alaska, the Squirrel River silently drains a one-million-acre block of public land managed by the U. S. Department of Interior's Bureau of Land Management, Kobuk District. The Noatak National Preserve and Kobuk Valley National Park border the watershed to the west, north, and east. To the south are Alaskan Native selected and conveyed lands along the Kobuk River. Kobuk District manages the Squirrel River watershed to maintain its natural characteristics as a representative river system of northwest Alaska. Local people have subsisted in the area for thousands of years. By 1909, prospectors had discovered gold on Klery Creek, a tributary of the Squirrel, and the village of Kiana was permanently established at the confluence of the Squirrel and Kobuk Rivers. More recently, sportsmen and other outside recreationists have come to the Squirrel River for moose, caribou, fishing, and river floating. Traditional subsistence lifestyles depend on healthy natural systems; yet, that need is now balanced in the Squirrel River region by the local peoples' desire to also create cash income opportunities for themselves and their offspring. Potential conflicts between subsistence, recreation, and mining activities within the Squirrel River and the enforcement difficulties in this remote region call for collaborative forms of planning and leadership. In 1993, Kobuk District initiated a process to address these issues and concerns; a process that will culminate in an Integrated Activity Plan (IAP) for the entire Squirrel River ecosystem under BLM management.

Background- In 1980, the Alaska National Interest Lands Conservation Act designated the Squirrel River in northwest Alaska as a study river under section 5(a) of the Wild and Scenic Rivers Act (WSRA). Management guidelines within the WSRA and BLM's own Wild and Scenic Rivers policy direct BLM to "manage the [the river study corridor] in such a manner to avoid degrading the river corridor during the study period." Until the U. S. Congress acts on a legislative proposal regarding Wild and Scenic River (WSR) designation, BLM must preserve and protect the river corridor's wild and scenic values. BLM is now preparing an Environmental Impact Statement which will contain alternative proposals for possible WSR actions. It may be 5-10 years before the WSR issue is decided and any subsequent management plans developed.

Management Framework Plan. The Bureau of Land Management's Northwest Planning Area Management Framework Plan (MFP), completed in 1982, is the only federal management plan presently addressing the Squirrel River watershed. The MFP is a broad regional plan. It was not intended to provide specific management guidance at the activity level within the Squirrel River watershed.

Human activity in the Squirrel River watershed is still relatively low; yet, BLM managers and local residents have reported that use of the area has been rising in recent years. Visitor use reports in the neighboring Noatak National Preserve also indicate a marked increase in summer and fall use. Kobuk District considers it very possible that, over the next five years, the Squirrel River may experience increased pressure from both river floaters and sport hunters.

The Integrated Activity Plan (IAP) will establish more detailed management guidelines under the umbrella of the MFP for the entire Squirrel River watershed. It will enable BLM to coordinate management actions throughout the watershed and fulfill its predominant management obligations inside the Squirrel River WSR study corridor. The IAP will feature management prescriptions which anticipate potential resource impacts from increased human use and prevent the degradation of the area's resource values. The IAP will also establish an appropriate monitoring program to document resource conditions.

Description of the Planning Area. The Squirrel River system provides an excellent representation of the geography and scenery in northwestern Alaska. The watershed is bounded by the crest of the Baird Mountains to the north and west; the Kallarichuk Hills to the east, and the Kiana Hills to the south and west. It is a relatively short river, flowing only about 95 miles through tundra, gravel floodplain, and spruce forest before it joins the Kobuk River at the village of Kiana. Its headwaters emerge at about 750 feet above sea level from among the 2500 - 3,000 foot peaks of the Baird Mountains (a southwestern extension of the Brooks Range). The Squirrel River continues in a southeasterly direction until it flows gently into the Kobuk River at less than 100 feet above sea level.

The IAP Planning Process. In 1992, BLM initiated a dialogue with citizens of the region about Squirrel River issues. Villagers in Noorvik and Kiana expressed concerns about preserving their subsistence lifestyle and about access to mining in the area. The BLM began the IAP process in the spring of 1993, with scoping meetings in both Kiana and Noorvik. Preliminary discussions were held with the mayor and representatives from the Northwest Arctic Borough, and with a representative from NANA Regional Corporation. BLM also conferred with personnel from the U.S. Fish and Wildlife Service, National Park Service, and Alaska Department of Fish and Game.

After scoping meetings, Kobuk District identified the various client publics and contacted representatives from state and local government, Native communities, environmental groups, guiding, air transport, recreation, and mining industries. Representatives of each were asked to participate in a Squirrel River Working Group to help establish goals and objectives for the area; suggest management guidelines to reach those objectives; and act as a volunteer advisory group to review BLM management ideas while in the preliminary draft stage. In April 1994, Kobuk District facilitated a working group meeting in Fairbanks. The working group agreed that the natural character of the region be maintained to afford the present resource based opportunities. They felt that proper management could maintain access for subsistence, recreation, and mining. They also contributed knowledge about the area; and generated ideas for management strategies.

Methodology. There are several planning and management frameworks conducive to an integrated planning approach: Limits of Acceptable Change (LAC) Visitor Impact Management (VIM) are the more common methodologies discussed in planning literature. Other planning frameworks are advanced regularly, often as adaptations to unique management demands. The most critical common themes are to *specify* the management goals and objectives and to systematically *monitor* the resource to ensure that the goals and objectives identified in the plan are being fulfilled.

Kobuk District has elected to utilize a planning process developed in coordination with a graduate student at the University of Alaska Fairbanks . The process has a strong grounding in the LAC process with several compo-

nents of the VIM process easily identifiable. Kobuk District has adapted the Recreation Opportunity Spectrum process to help assuage public perceptions of a management bias toward recreational activities by substituting "Resource Quality" for "Recreation Opportunity." The IAP process is designed to facilitate proactive management by emphasizing both the careful development of management objectives for an area, and the assessment of impacts from management decisions *before* those decisions are implemented.

Squirrel River IAP Process Outline

Step 1. Identify Area Features, Issues, and Management Constraints.

Step 2. Describe Area Vision and Develop Management Objectives.

Step 3. Define and Describe Desired Resource Quality Classes (RQCs). Identify Alternative Resource Quality Class Allocations for Specific Areas.

Step 4: Select Preferred RQC Allocation Alternative.

Step 5: Identify Probable Causes of Impacts to Resource Quality.

Step 6: Select Appropriate Indicators and Inventory Existing Conditions for those Indicators.

Step 7: Determine Indicator Standards Reflecting Desired Conditions and Compare to Existing Conditions.

Step 8: Develop Management Strategies and Analyze Potential Resource Impacts of those Strategies.

Step 9: Implement Selected Management Strategy as Necessary and Monitor the Resource. Repeat Planning Process as Needed.

Conclusion. The draft Integrated Activity Plan will be completed during the summer of 1994. The Squirrel River Working Group has agreed to review the draft and submit their recommendations. The at-large public will also have an opportunity to review and comment on the draft plan. Kobuk District staff are now developing a systematic resource monitoring program to document a variety of resource conditions within the watershed, and to fit the logistical constraints faced by the district. After the IAP has been implemented, the working group will meet periodically to discuss the plan's effectiveness and continue management in the active sense. To date, the IAP process is meeting its objectives and helping to improve BLM's working relationship with its client public. Working group members have expressed their appreciation for this opportunity to have substantive input into the management direction for the Squirrel River basin.

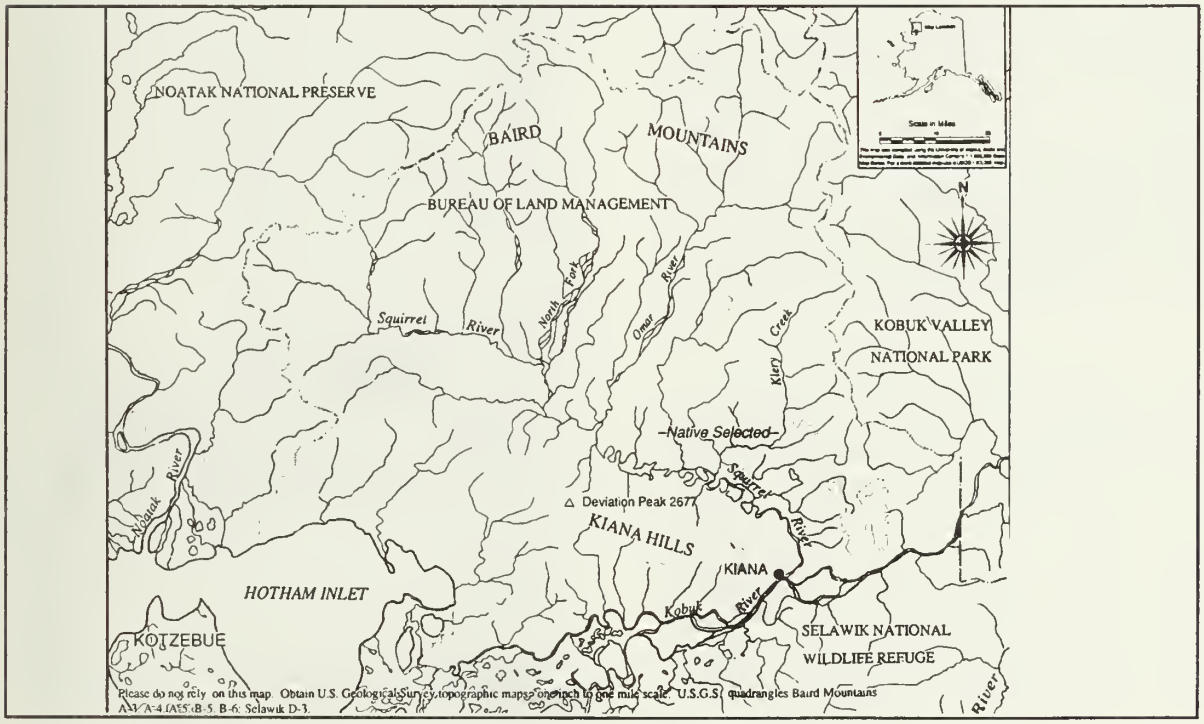

Figure 1. Squirrel River Map

638: Surveying the Future

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Native Survey Contracts mean big changes for BLM- Mention "Alaska" and people think of a vast and rugged frontier land with craggy mountains, wild rivers and caribou roaming the tundra. It's all true.

The Bureau of Land Management, an agency of the U.S. Department of the Interior, manages 90 million acres of federal public land in Alaska—much of it both beautiful and remote. These days, the agency's role in land management is changing dramatically. One of the biggest changes is how millions of acres of Native-selected land are being surveyed.

In the mid-1970s, BLM-Alaska began the huge task of transferring millions of acres of land selected under the Alaska Statehood Act , the Alaska Native Claims Settlement Act, and the Native Allotment Act of 1906. ANSCA entitled Native organizations to a total of 44.5 million acres—about 12 percent of the total 365 million acres of land in Alaska. The Native Allotment Act added another 15,000 applications for federal land to the huge work load BLM faced. These millions of acres must be surveyed before Native organizations and individuals can obtain legal title to their lands.

The Indian Self-Determination and Education Assistance Act of 1975, also known as PL 93-638, allows tribal organizations the right of first refusal to contract to do cadastral surveys on Indian land in Alaska. The BLM, which has the sole authority to approve cadastral surveys of federal public lands, authorizes tribal organizations to do these "638" contracts.

Income from these contracts goes to Native villages, along with any other jobs and services necessary to support the project. BLM helps tribal organizations obtain the survey contracts, and provides training and on-the-job assistance to Native surveyors as they learn.

Cadastral Survey tackles a new role- Surveying a state twice the size of Texas, with 365 million acres of rugged terrain that is mostly roadless and uninhabited, and with a climate known for its severity and unpredictability, is perhaps the most challenging and difficult survey assignment ever undertaken. Just ask the Alaska-BLM's Division of Cadastral Survey, which oversees the surveys of all federal lands selected by the State of Alaska, and by Native individuals and organizations.

The Alaska Statehood Act of 1959 granted 104.5 million acres of public land to the state. Add the 44.5 million acres conveyed by the Alaska Native Claims Settlement Act, and the 15,000 applications for Native allotment parcels—40 to 160 acres in size—under the Native Allotment Act of 1906, and you get an idea of the huge task confronting the BLM-Alaska's cadastral crew.

Cadastral surveys: In Alaska, the acreage involved is staggering, and the work load in cost and time is unprecedented. Each parcel must be surveyed on the ground, and most are located in remote areas accessible only by helicopter or small fixed-wing aircraft. High labor costs, the expense of air travel in Alaska, and a short field season of between three and five months make surveying land claims a costly business.

Technology: The BLM-Alaska's Cadastral Survey Division has been on the cutting edge of innovative survey technology and equipment for the last 25 years. Using both the Inertial Navigation System and Global Positioning System streamlines the processing of thousands of miles of rectangular surveys. A grid system defines the location of any given point on the earth's surface by its latitude and longitude. These geographic positions are published on protraction diagrams that have served as the basis for all cadastral surveys since statehood.

"638" contract work: In Alaska, the Cadastral Survey Division has expanded to include oversight of the "638" Native contract program. BLM uses an elaborate planning and coordination process to schedule field surveys. Each year, BLM identifies survey projects and solicits proposals for various Native conveyances.

Negotiations between Native organizations and the federal government for "638" survey contracts have been based on mutual respect and cooperation. This working partnership is a key tool contributing to economic strength and enhanced self-determination for Natives.

Requesting a 638 survey contract-

• To request 638 contract survey work, a tribal governing body submits a letter of intent and resolution authorizing an applicant to negotiate a contract with the BLM.

• The contract must follow specific conditions written in the tribal resolution and any tribal laws that may apply.

• Tribal organizations are free to contract for any part of the work that will benefit the tribe.

• Preferences and opportunities for training and employment connected with the administration of the contract work go to the Natives served by the contract.

• PL 638 requires the BLM to reimburse a "638" contractor for 100 percent of what the agency would spend on the project, plus indirect costs—an amount usually between 20 and 40 percent of the project.

Maniilaq Association brings jobs and training to villages

Barbara Janitscheck, Tribal Operations Administrator for the Maniilaq Association, knows the valuable opportunities that "638" contracts provide to villages. She worked with the BLM to secure a $913,052 contract to survey 200 Native allotments near Kotzebue.

Eleven Native surveyors were hired and trained. "We wanted to brings jobs to our Native villages," says Janitscheck, "to bring that control to the local level, and keep the economic benefits in our own communities."

Helen Bolen, Maniilaq's Director of Administration, says, "The big push was to give our people in the villages job prospects. We used local people wherever possible, local businesses right here."

Both Maniilaq Association and Tanana Chiefs Conference praise BLM's dedication to the 638 program.

"We were very satisfied with the people we dealt with at BLM," said Perry Ahsogeak of Tanana Chiefs Conference. "The BLM contracting officer, on-site people, '638' coordinators—

everyone was very helpful."

638 Contracts—A little history- Almost 20 years ago congress passed a bill that's making a big impact in Alaska today, especially to Natives and BLM's cadastral surveyors.

The Indian Self-Determination and Education Assistance Act of 1975 was intended to increase tribal participation in the management of Federal Indian programs, and to help

ensure long-term financial support for tribally-run programs.

The law, also known as Public Law 93-638 or "PL-638," authorizes tribes to contract with the federal government to operate programs serving their tribal members. Native organizations can contract with federal agencies to provide services for themselves that were previously provided by the federal government. The contracted work must be solely for the benefit of the Natives served by the contract, and federal agencies must continue to provide such services until a Native organization chooses to do so.

In Alaska, PL-638 gives tribes the right of first refusal to contract to do Cadastral survey work on Indian lands. This includes surveying the millions of acres of land granted by the Alaska Native Claims Settlement Act of 1971 and the Native Allotment Act of 1906. Prior to PL-638, this work could be done only by the federal government, or under a government procurement contract awarded by architectural and engineering (A&E) procedures.

BLM identifies survey projects for various Native conveyances, and solicits proposals each year prior to survey in the field. The proposals are costly to submit and time consuming, but the economic benefits are highly anticipated by Native organizations.

BLM provides each requesting Native organization with technical and administrative support. The agency prepares special instructions for the contractors to follow, and conducts field inspections and reviews of survey work. An on-site field inspector monitors the survey and provides assistance when needed.

Since the 638 survey program is quite new, a great deal of on-the-job training occurs at each site. By working closely with contractors in the field, BLM helps correct deficiencies in survey procedures at an early stage, thus saving many hours of correction work and possibly making the difference between a money-making project and a crippling loss.

The result of this cooperative effort is a survey plat which replaces the land description in the Interim Conveyance, and is necessary for the conveyance to be completed.

Tanana Chiefs hires Scammon Bay Trainee- "638" contracts get a big welcome in many Native villages where job prospects are otherwise scarce. Bruno Kasayuli, Jr., from Scammon Bay, was hired by Tanana Chiefs Conference last summer as a survey officer trainee. He worked with both survey crews and administrative staff.

"Working in the office, especially with the computer programs, helped me better understand what goes on out in the field," Kasayuli says. "The field work is physically demanding—clearing brush to make the lines, but the office work is very demanding mentally."

Kasayuli plans to become a licensed land surveyor. He encourages others to try. "I felt my chances were pretty slim to get this job," says Kasayuli. "Tanana Chiefs is a huge organization. I thought they would have a lot of applicants since the job had good pay and opportunities. But I went for it, and here I am."

Perry Ahsogeak of Tanana Chiefs Conference, says their employment is 82 percent Alaska Native. "The '638' process is very beneficial to our tribes," says Ahsogeak. "They receive training and jobs, and end up with a quality survey."

Last summer they hired nine Native survey technicians who worked closely with nine non-Native licensed land surveyors. The Tanana Chiefs has a four-year training program to prepare their survey technicians for the land surveyor licensing examination.

In an historic move to settle Alaska Native aboriginal land claims, Congress passed the Alaska Native Claims Settlement Act (ANSCA) in 1971. President Nixon signed this critical law but only after asking the Alaska Federation of Natives if it approved. AFN delegates approved by a vote of 511 to 56.

Tracking Land Conveyances- Following passage of the Alaska Statehood Act and the Alaska Native Claims Settlement Act of 1971, BLM-Alaska began a huge adjudication and land transfer program to transfer federal public lands to the state and Native organizations as quickly as possible.

Under ANSCA, the federal government transferred large blocks of land to Native corporations and villages through Interim Conveyances. These "IC's" gave Native corpo-

rations full rights, title and interest to their selected land until formal surveys are completed and a final patent (government deed) to the land is issued.

Although the 212 Village and 12 Regional corporations formed under ANCSA account for most of the acreage being conveyed, BLM gives top priority to processing the 15,000 individual applications for individual Native allotments filed under the Native Allotment Act of 1906.

The Patent Plan Process: In 1985, BLM-Alaska adopted the Patent Plan Process to systematically transfer ownership of federal public lands in the most efficient and cost effective manner possible. A published schedule notifies Native organizations when the agency is preparing and planning to issue contracts for proposed survey projects, as funding becomes available.

The Cadastral Survey Division uses a priority system to plan the geographic areas, or "windows" to be surveyed during a particular field season. After the field survey, it usually takes a year and a half for the survey plat to be approved.

Adjudication: State lands may be patented at this point, but for Native corporations the work still isn't finished. The time frame for conveying Native selections rests more with answers to legal questions than with questions about policy and procedures. Five key issues affect the time needed to convey lands: easements, navigability determinations, land allocations, eligibility questions and land availability.

BLM's conveyance division determines whether an application meets the requirements of law, and takes the necessary steps toward issuing either an approval decision and conveying title, or a rejection decision.

Settling land claims: The conveyance program is an often bewildering array of judicial decisions, legal opinions, laws that often have been amended, and various agreements between interested groups. Land claims often overlap and conflict. Not surprisingly, Native corporations and the State of Alaska frequently claim the same parcels of land.

The situation is often further complicated by the presence of federal mining claims or Native allotments. Thousands of the individual claims selected under the Native Allotment Act are located within lands selected by the state and Native corporations. These allotment applications must be processed, surveyed, and conveyed before the State and Native corporations can receive patent to adjacent areas.

Current land status: As of March 31, 1994, BLM has issued patents to 12.45 million acres of surveyed land granted by ANSCA, with 23.66 million acres of unsurveyed lands still under Interim Conveyance. The BLM has yet to survey and patent an additional 33.11 million acres of unsurveyed land .

"It's working..."

"I truly believe Alaska Natives have a right to administrate their own programs. But we've always had a bureaucracy to do it for them. I think the success of this field season (1993) shows that Native organizations are fully capable of providing many of their own services...I believe Alaska Natives have the ability to train their people better than we can. Our job is to give them the tools."

—George Oviatt, Deputy State Director, Division of Cadastral, BLM-Alaska

"The '638' process is very beneficial to our tribes. They receive training and jobs, and end up with a quality survey."—*Perry Ahsogeak, Tanana Chiefs Conference*

"I think an important point is that we aren't creating a bureaucracy—dollars are going out to the Native corporations. We're creating jobs."

—George Oviatt

"This year (1993) we did the normal field inspections—we just changed our hats a little, and went out and did the same thing for a different contractor. Since the 638 program is so new, a lot of training went into the process. We helped explain specifications and procedures, and tried to give direction on how to solve survey problems that crop up. Overall, it went well."—*Orrin Frederick, BLM land surveyor*

"This is the first professional job I ever had. My other jobs were in labor, physical-type jobs. I'm taking on a lot of responsibility here; it's a real challenge.

I felt my chances were pretty slim to get this job. Tanana Chiefs is a huge organization. I thought they would have a lot of applicants, since the job had good pay and opportunities.

But I went for it, and here I am."—*Bruno Kasayuli, cadastral survey officer trainee*

"BLM is committed to carrying out the intent of the Indian Self-Determination Act. Contracting to do these land surveys for themselves brings greater autonomy and economic benefits to Alaska Natives. Contracting with Alaska Native organizations to survey Native-selected lands makes sense and is a perfect way to carry out the intent of the Self-Determination Act."—*Williams Calkins, BLM State Director, New Mexico*

"We wanted to bring jobs to our Native villages, to bring that control to the local level, and keep the economic benefits in our own communities." —*Barbara Janitscheck, Maniilaq Association*

"The big push was to give our people in the villages job prospects. We used local people wherever possible, local businesses right here."—*Helen Bolen, Maniilaq Association*

Strategies For Balancing Biodiversity And Economic Stability In California's San Joaquin Valley

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The San Joaquin Valley produces 65% of California's oil and gas, includes the nation's top three counties in gross farm sales, contains 4.7 million acres under irrigation supported by the annual delivery of 18.5 million acre feet of irrigation water, loses annually an estimated 45,000 acres of farm and natural lands to urban encroachment and supports 10 federally listed protected plant and animal species as well as numerous candidate species.

Efforts are underway in the San Joaquin Valley to form a regional consortium, lead by local government, to develop consensus based regional strategies to conserve biological diversity and maintain a healthy economy.

While this is but one of many such regional efforts underway in California under the umbrella of the statewide "Agreement on Biological Diversity", this effort is uniquely suited to the summit themes.

The call for creation of a consortium to work on regional strategies is being lead by an interagency team composed of representatives from the BLM, USFWS, BOR, SCS, California's State Resources Agency, Departments of Fish and Game and Water Resources and the Resource Conservation Districts. This diverse group along with local governments, interest groups and land owners will represent a good example of collaborative leadership in developing regional ecosystem initiatives addressing biological, social and economic issues.

The San Joaquin Valley effort represents serving the public and improving the way we do business by placing an increased focus on the need to better understand the interrelationships between the social, economic and biological resources of the region and an increased demand for participation in establishing regionally based consensus strategies for the future. Local, State and Federal governments all recognize the need for regional strategies that set the stage for local project implementation, reducing duplication in regulations and establishing streamlined permitting procedures.

Regional strategies for the valley will address approximately 9 million acres of land within 8 counties. Over 90% of the land base is in private ownership and it is estimated that less than 10% of the land within the valley

retains natural characteristics suitable for native species. This situation leads to an extremely high dependency on cooperation from local governments and private land owners in the development of successful regional strategies for maintaining both biological diversity and economic stability.

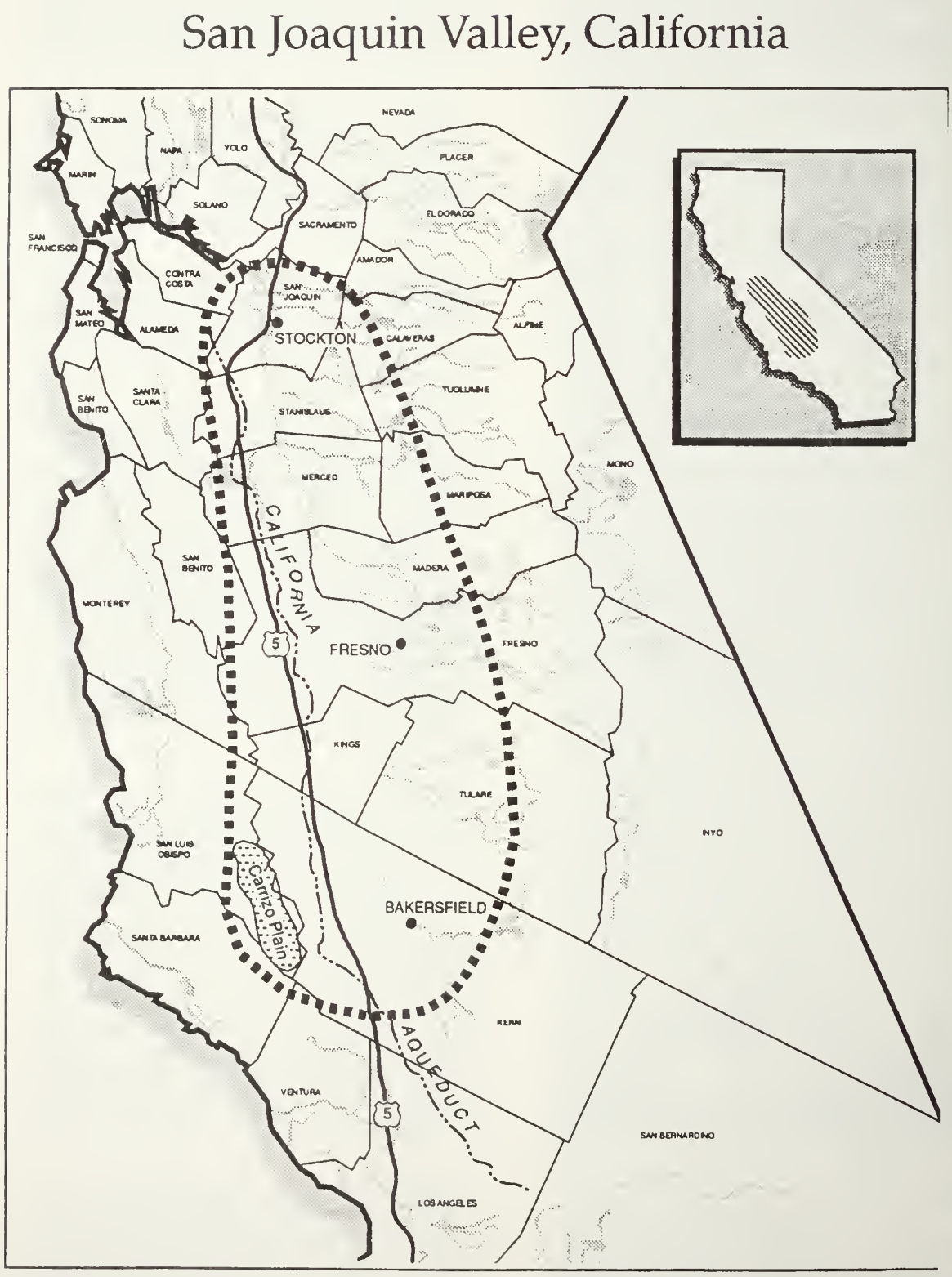

Figure 1. Location Map

Take Pride In Utah

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TPIU is managed by a three-person executive committee, with the Director from DNR, the lead agency, serving as the Executive Director; the Utah State Director of BLM; and the Forest Supervisor of the Wasatch Cache National Forest.

Operation of TPIU is directed by a steering committee consisting of a representative from each organization, with the representative from DNR serving as the chair.

With a motto of "together we can make a difference," TPIU promotes collaborative leadership between members of the partnership through shared participation in education, public service, and the spirit of volunteerism. TPIU serves current publics through sponsorship of Statewide volunteer projects and serves future publics through education curriculum development.

TPIU was initiated to stimulate students, parents, and visitors to be more responsible in actions and behaviors that may impact the environment while building an awareness to help other people realize their responsibility toward the environment.

The ultimate goal is to provide all teachers in Utah public schools (grades K-6) with lesson plans and resource materials to integrate the teaching of a responsible outdoor ethic toward the world we live in as they meet core requirements in the curriculums of healthy lifestyles, visual arts, science, language, arts and social studies. This project will be the pilot of the Teachers' Guide in three schools during the 1994-95 school year.

Accomplishments in the areas of public service and the spirit of volunteerism are numerous. Most significant are (1) engaging the services of volunteers from the Wasatch Front metropolitan areas to travel over 100 miles to assist rural communities in preparing their areas for a visit from the Governor and the 400-plus participants in the Governor's Conference on Recreation, Tourism and Economic Development; and (2) serving as a catalyst for over 300,000 volunteers (over 1 million volunteer hours) responding to the Governor's call to clean up the State on Take Pride in Utah Day, May 14, 1994.

The goal for 1995 is over 1 million volunteers.

"Tread Lightly!" A Collaborative Partnership

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Tread Lightly! is a program and a philosophy aimed at encouraging responsible and safe travel techniques when visiting wild land recreation areas. It was developed in 1986 by the U.S. Forest Service to help protect private and public lands through education about low impact and back country travel. Thereafter, the program was adopted by Bureau of Land Management.

The Bureau of Land Management and U.S. Forest Service realized in order to reach current and future publics and solicit the support of the private sector, a collaborative effort would be required. In 1990, a Memorandum of Understanding (MOU) was signed between the U.S. Forest Service, U.S. Bureau of Land Management and a new non-profit organization known as Tread Lightly! Inc. This created a collaborative partnership to administer and expand the program and at the same time reduce the individual agency costs.

With the collaborative efforts of hundreds of sponsors, through Tread Lightly! Inc., we now have a comprehensive national public information and education campaign which is developing in every citizen a new sense of personal commitment and responsibility for the welfare and proper use of public and private lands. These sponsors are helping provide, leadership, expertise and financial assistance to help us improve the way we do business.

As part of the collaborative partnership, Honda Motor Company just sponsored and assisted Tread Lightly! Inc., BLM, and the USFS in development of a new Tread Lightly! color poster. The color poster illustrates the Tread Lightly! pledge with scenes depicting an array of backcountry activities and how to minimize environmental impacts. It shows all kinds of outdoor recreation enthusiast sharing the lands and enjoying their sports responsibly. This is the first program designed specifically to educate elementary school children. It will be easier to teach children responsible use of off-highway vehicles from the start, than to change their habits when they become adults. There is no better bridge between the present and our vision for the future than our children's strong respect for the environment. Honda has distributed copies of the poster, free of charge, to all 58,000 grade schools in the country to help educate a new generation about Treading Lightly! principles. They have also produced free posters to distribute to the

public through all BLM and USES Offices.

To increase the interest and exposure of the Tread Lightly! program, Tread Lightly! Inc., Chevy Motor Company, the Specialty Equipment Market Association (SEMA) and seventeen aftermarket and outdoor companies joined together to create an environmental education project vehicle: the Tread Lightly! Blazer. The project Blazer is an educational showcase of products and techniques combined to aid outdoor enthusiasts and sportsmen in protecting the backcountry environment, as they enjoy it. The project is a platform for several companies who support the principles of Tread Lightly! and whose products meet and demonstrate the goal of minimizing environmental impact from a variety of recreation activities.

They have further sponsored the development of a new "Tread Lightly! Guide To Responsible Four Wheeling" booklet to help educate the public on how to operate a four wheel drive safely and responsibly to minimize impacts to the environment.

Chevy Truck Division has provided a grant to Tread Lightly! Inc. to help the public learn to four-wheel drive safely and tread lightly! in the backcountry. Three courses will be conducted this summer to help 4 wheel-drive clubs and the public learn the basics of four-wheel drive techniques and create an awareness for environmental concerns on public and private lands through the Tread Lightly! program. The clubs will then put on their own clinics and continue to promote the Tread Lightly! message.

A "Tread Lightly! Science Manual" has been developed by Tread Lightly! Inc., in cooperation with the federal agencies, that fits into the core curriculum of high school science teachers. It has a strong emphasis on biomes and their various components such as soils, plant succession, wildlife, etc. to emphasize the importance to maintain healthy ecosystems.

The annual operating budget to develop and promote the Tread Lightly! program through Tread Lightly! Inc. is $300,000 to $500,000. This cost is being covered by the private sponsors.

BLM's efforts to reach a broader spectrum of the public, encourage responsible recreation use of public lands and improve the way we do business could not be achieved without the collaborative leadership and combined efforts Tread Lightly! Inc. and the many members they represent.

Trapper Creek Aquatic and Riparian Restoration Project

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Introduction. Trapper Creek is one of several small streams that traverse the crown of the Naval Oil Shale Reserve west of Rifle, Colorado. The Reserve is a high plateau that features abrupt cliffs on three sides. The streams atop the Reserve all plunge dramatically off these cliffs. Aside from their aesthetic beauty, the towering waterfalls have acted to isolate native Colorado River cutthroat trout *(Oncorhynchus clarki pleuriticus)* populations from invasion by non-native trout species that came to dominate the waters below the cliffs. The Naval Oil Shale Reserve streams are home to some of the last remaining pure populations of the Colorado River cutthroat trout.

In 1982, the BLM completed an Aquatic Habitat Management Plan for the streams on the Naval Oil Shale Reserve. The plan identified the degraded state of the riparian areas adjacent to Trapper Creek as the limiting factor to the cutthroat trout population. Unfortunately, the loss of the fishery biologist position and lack of funding prevented the proposed habitat recovery projects for Trapper Creek from being implemented. In 1988, the BLM constructed two livestock exclosures to protect riparian vegetation and installed 22 instream log drop structures to create pool habitat in Trapper Creek. By 1991, the log drop structures were in need of repair, and other planned improvements had again fallen victim to lack of funds and manpower.

Figure 1. Willows are planted along the toe of eroding streambanks to help stabilize the soil.

Realizing that Trapper Creek offered an opportunity for a long-term cooperative venture, BLM turned to the Grand Valley Anglers Chapter of Trout Unlimited for assistance. The fact that the Trapper Creek watershed was in need of restoration and supported a self-reproducing population of native trout made it

an ideal choice for an extended joint project.

The cooperative effort between the BLM and Trout Unlimited to restore the aquatic and riparian habitat in Trapper Creek was initiated in 1991. The Grand Valley Anglers Chapter of Trout Unlimited, based in Grand Junction, Colorado, has informally "adopted" Trapper Creek. Every year since 1991, Trout Unlimited members spend a weekend working with the BLM to clean out and repair existing log structures, maintain the exclosure fences, and plant thousands of willow and cottonwood cuttings to help reestablish woody riparian vegetation. Over the past four years, volunteers have donated over 1,000 hours of labor to the improvement of Trapper Creek.

The dedication of the Grand Valley Anglers to enhancing habitat of Colorado River cutthroat trout has earned them well-deserved national recognition. BLM Director Jim Baca singled out the Grand Valley Anglers to receive his 1993 Riparian Stewardship Award for their outstanding efforts. When BLM encountered difficulty with funding for planned work on Trapper Creek for 1994-95, National Trout Unlimited contributed $2,500 in the form of a grant from their Embrace-a-Stream Program. Embrace-a-Stream money will be used to rebuild portions of riparian exclosure fences, construct additional log-drop structures to create pool habitat, purchase cottonwood saplings to plant in the restoration area, and install juniper revetments to stabilize eroding banks. All labor for these projects will be donated by volunteers.

Realizing that habitat improvement efforts on Trapper Creek would be fruitless without a concurrent change in grazing management, BLM got together with the grazing permittees to revise the existing Allotment Management Plan (AMP). Before updating the JQS AMP, BLM met with the affected permittees to solicit their recommendations. The end product was truly a cooperative effort, incorporating comments and suggestions from the five permittees who graze the allotment. The new JQS AMP, completed in June 1993, includes several changes designed to protect riparian areas. It stipulates that the permittees provide a rider each day to move cattle out of riparian areas, sets utilization limits for both herbaceous and woody riparian vegetation, and identifies numerous projects designed to provide alternate sources of livestock water in upland areas.

Figure 2. Volunteers work together to haul another batch of willow cuttings from nearby Northwater Creek for transplanting along Trapper Creek.

Figure 3. Cages are placed around some of the newly planted willows to provide protection from grazing wildlife and livestock.

Discussion. The ultimate objective of the Trapper Creek aquatic and riparian restoration project is to restore the Trapper Creek ecosystem to a healthy condition. Loss of riparian vegetation along Trapper Creek has resulted in high summer water temperatures, increased width:depth ratios, and a lowered water table causing the upstream reaches of the stream to become intermittent in most years. The combination of lack of pool habitat, low or nonexistent late summer flows, and high temperatures has forced the Colorado River cutthroat trout to move downstream. The trout are restricted to the lower 0.5 miles of the creek where steep canyon walls provide shade and create a narrower and deeper channel. The native Colorado River cutthroat trout is the cornerstone of the aquatic ecosystem in the creek, and the project is attempting to increase the trouts' range and numbers. Improved riparian areas will also provide habitat for numerous other species and thereby

contribute to the overall health of the ecosystem.

The ongoing success of the Trapper Creek project illustrates an improved way of doing business for the BLM. While BLM has always utilized volunteers, the Trapper Creek project has evolved beyond the typical BLM cooperative effort. The members of Trout Unlimited have developed a feeling of ownership towards Trapper Creek, and now are actively providing their own ideas, planning, and funding for future habitat improvement projects on the creek. The Trapper Creek project has developed beyond a simple cooperative endeavor and become a true partnership. BLM has gained a reliable and skilled source of volunteer labor, who are eager to continue building on accomplishments from past years. BLM no longer has to spend time recruiting volunteers for this project—in fact, Trout Unlimited members recruit new volunteers each year. Greater use of volunteer labor and funding will become a mainstay of the BLM as budgets and staffs continue to shrink. BLM must continue to foster long-term partnerships in the future by matching private interest groups with suitable projects and instilling a sense of ownership within group members.

Wells RMP Elk Amendment

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Introduction.- Through a review of elk habitat management in the Wells Resource Area (RA), it was determined that elk numbers and habitat use areas are expanding from those identified in the Approved Wells Resource Management Plan (RMP) Record of Decision (ROD) signed July 16, 1985. Elk habitat management objectives were identified for the Pilot (east central side) and Jarbidge Mountain (northwest corner) areas in the Wells RMP. At that time, Jarbidge was identified as a future management area. Elk were reestablished in the Jarbidge Mountains on Humboldt National Forest lands in January, 1990. The Jarbidge elk herd has remained within identified management areas on Elko BLM and adjacent Humboldt National Forest lands. However, elk are recognized as highly adaptable creatures and during recent years have pioneered adjacent unoccupied habitats in the Wells RA from the Pilot Mountain management area, northwestern Utah and southern Idaho.

A policy statement issued by the State of Nevada Board of Wildlife Commissioners on December 6, 1988 identified Pilot Mountain as the only established elk population in the Wells RA. This policy statement recognized that elk were pioneering into adjacent habitats, however, no evidence existed to indicate these pioneering elk have established permanent populations outside the Pilot Mountain management area.

In 1990, the Nevada Division of Wildlife (NDOW) identified established elk populations on Pilot Mountain as well as the Crittenden/Goose Creek, Murdock Mountain, and 10-Mile/Black Mountain areas. The NDOW identified these populations outside Pilot Mountain as being established because they have maintained a breeding nucleus of animals for the past 4-8 years, are commonly sighted throughout the year and do not appear to migrate to Pilot Mountain or to other areas seasonally. Because of social behavior and high adaptability to available habitat types, elk have more recently been pioneering outside these management areas as well as immigrating into the resource area. Elk have been sighted in the Snake Range, East Humboldt Range, South Ruby Range, and Spruce Mountain.

Because of the growing concern for expanding elk numbers in the resource area and their

potential impact to attainment of existing multiple use objectives identified in the Wells RMP/ROD, the decision was made by the Nevada State Director to address this issue through amendment of the RMP.

Purpose and Need for the Amendment: The purpose of this amendment is to establish elk habitat management areas, identify habitat requirements and specific management objectives and practices, establish target elk population management levels, develop factors for attainment and future adjustments in elk population management levels, and identify constraints on other resources.

Location: The Wells RA is located in the northeast corner of Nevada and encompasses approximately the east half of Elko County. It contains 5.7 million acres of which 4.3 million are public lands administered by the BLM.

Planning Issues And Criteria- Elk management decisions in the Wells RA could have impacts on adjacent private and public lands within the tri-state region of Nevada-Utah-Idaho. Conversely, elk management decisions on public lands in adjoining states could have impacts on private and public lands within the Wells RA. Therefore, a regional approach was felt appropriate in addressing the issue of pioneering elk. A regional approach will also allow for continuity with adjacent public land management agencies in future land use planning efforts. Therefore, a task force consisting of four BLM District offices, two Forest Service Ranger District offices, three state wildlife agency offices, the Nevada Wildlife Commission, the Elko County Commissioners, the Rocky Mountain Elk Foundation, the Elko County Advisory Board to Manage Wildlife, and three private land owners within the tri-state area (Map 1) was formulated to provide for this continuity. The task force was utilized to formulate planning issues, identify the scope of environmental analysis, identify management alternatives to be considered, and provide baseline information.

A scoping document was prepared which included the management issue, management objectives, preliminary planning criteria, and alternatives. During this amendment's 45 day scoping period, from May 14 to June 30, 1993, the public was asked by BLM to assist in further defining the planning issue, if necessary. In addition, the public was also asked to help in: 1) further defining the range of alternatives; 2) establishing planning criteria for the development of the amendment; and 3) identifying any other concerns or interests to be considered. Public scoping meetings were held in Twin Falls, Idaho (June 1, 1993) and Wells, Nevada (June 2, 1993).

Through use of the Task Force and through public scoping, it had been determined that the amendment need only address the issue of elk habitat management. In addressing this issue, the amendment responded to the following planning questions:

1. Where will elk be managed on public lands in the Wells RA?
2. What habitat requirements and specific management objectives and practices are needed for elk?
3. What target elk population management level will habitat be managed to support?
4. How will elk population management levels be achieved or maintained?
5. How will adjustments be made in elk population management levels?
6. What constraints, if any, will be placed on other resource uses?

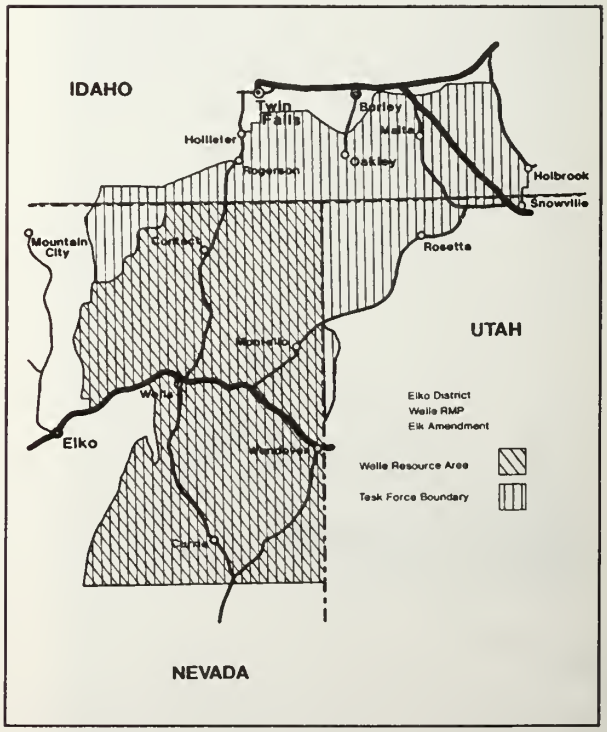

Figure 1. Location Map

West Eugene Wetlands Project

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Introduction.- The West Eugene Wetlands Project is a cooperative venture by the Eugene District BLM to acquire and manage wetlands and other connected open spaces (USDI 1993). These wetlands will serve a variety of public purposes including resource protection and enhancement of wildlife, botanical, and riparian values; stormwater and flood control; recreation; and mitigation sites to support urban development activities. The project area is located on the western edge of Eugene, Lane County, Oregon, in the southern end of the Willamette Valley. The Long Tom River watershed encompasses the project boundaries, which include Amazon Creek (a major tributary draining south Eugene) and Fern Ridge Reservoir, a 9000-acre lake managed by the U.S. Army Corps of Engineers.

Background-. In 1989 Eugene began to develop a wetland plan that would allow sound urban development to continue while protecting important wetland values and rare plant communities, particularly Willamette Valley wet prairie. The Bureau's role began in 1991 with congressional appropriations to begin acquisition using Land and Water Conservation Funds. The West Eugene Wetlands project office was established and the Bureau began purchasing area wetlands in 1992. The program has continued with a projected acquisition through 1994 of over 1000 acres. The project may eventually cover upwards of 4,000 acres of protected and restored wetlands and associated upland habitats.

Partnerships/Environmental Education.- The West Eugene Wetlands partnership is composed of the BLM, The Nature Conser-

Figure 1. Logo of Wetland project

vancy, Lane Council of Governments, Lane County, and the City of Eugene. A Wetlands Executive Team serves to coordinate implementation of the project, as emphasized in a cooperative agreement. As the project continues to develop, it is anticipated additional partners may include Oregon Department of Fish and Wildlife, U.S. Fish and Wildlife Service, Corps of Engineers, Environmental Protection Agency, and Ducks Unlimited. The current partners have worked together to implement a plan that will resolve conflicts between economic development and wetlands protection and restoration. This plan has been recognized as a national model for wetlands planning. Faculty at OSU and UO have and are planning to use project lands for classwork and graduate research. Secondary and elementary schools have made extensive use of project lands and resources for field trips, classroom presentations, and student projects.

These partnerships with agencies and publics, established through the combined efforts of Bureau employees, provide examples of how collaborative leadership will insure success of the West Eugene Wetlands Project.

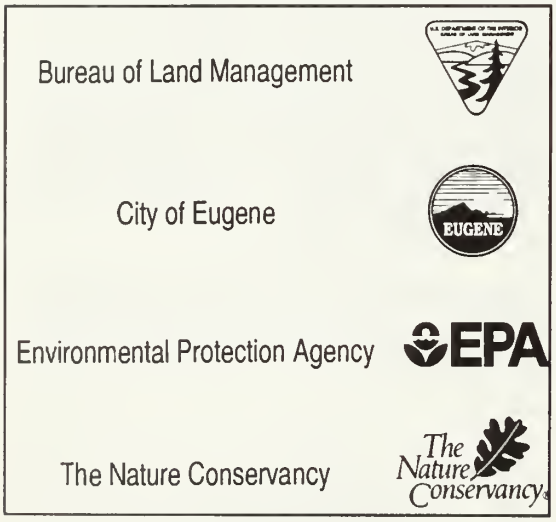

Figure 1. Logos

Ecosystem Approach.- By applying an ecosystem approach to the West Eugene Wetlands Project, the Bureau can reach beyond the limits of local municipalities and tie together important habitats and hydrologic functions. A planned watershed assessment for the Long Tom River watershed will help set the framework to manage wetlands within the river basin as a functional system. Ecosystem planning will pull together management of a variety of public and private ownerships, including federal, state, city, and Nature Conservancy lands. This complex of wetlands and associated upland habitats will serve as an anchor for the southern Willamette Valley, and compliment the existing national wildlife refuge system to the north. This approach of reviewing the "big picture" and working with active partners to manage under that realm will not only maintain healthy ecosystems but will help promote and restore the once vast Willamette Valley grasslands.

Staffing-The Bureau's West Eugene Wetlands office is operated within the Eugene District's Coast Range Resource Area, and has a staff of six including a project manager, office manager, and four realty specialists. Half of the project staff are from under-represented segments of the work force. In addition, resource specialists from the District including soil scientists, hydrologists, botanists, wildlife biologists, fuels specialists, and recreation planners assist with management and project issues. Three of the realty specialists were retrained for these specific duties, coming from diverse backgrounds including forestry, engineering, and procurement. This commitment to promote and retrain exemplary employees to meet the demands of ecosystem management and the changing Bureau mission is a small but significant step towards diversifying the work force.

Ecological Significance-. The West Eugene Wetlands project area has important ecological values, both botanical and wildlife. One of the most endangered plant communities in the nation, Willamette Valley wet prairie, will be protected and restored through the efforts of this project. Presently this habitat type occupies less than 1% of its original presettlement condition. This habitat was maintained through periodic burning by Native Americans to remove woody vegetation and retain grassland conditions. This wetland prairie community contains a number of federally listed and candidate plant species, as well as several other rare endemic species. The area supports a large diversity of wildlife species, including federally listed and candidate species and over 150 species of birds. Although it may not compare to high profile wildlife refuges, this diversity is significant, particularly for the urbanized and highly agricultural Willamette Valley. The Bureau's efforts in review of lands to be aquired have resulted in public ownership patterns capable of supporting greater species diversity.

Discussion.- The entire scope of the West Eugene Wetlands project reflects the Bureau's continued efforts to serve our publics. Through environmental education projects including a proposed interpretive center, important steps to promote the value of wetlands will be accomplished. Protection and restoration efforts will insure important resources will be present for future generations. Working through partnerships under the umbrella of the West Eugene Wetlands Plan, sound economic development will occur without sacrificing valuable resources. Stormwater and flood control benefits provided by the project will add to the social importance, as well as the recreational opportunities provided to the nearby metropolitan area.

Involvement in the West Eugene Wetlands has resulted in dramatic improvements in the way the Bureau conducts business. The partnerships have established relationships and experience that will carry through all land management endeavors, as the Bureau strives to break down artificial barriers that interfere with true ecosystem management. This project has resulted in the Bureau branching out in non-traditional resource management fields. This has allowed for the use of employee skills as Western Oregon transitions from historical timber production levels to overall management of ecosystems Overall, the Bureau's image will improve with positive actions towards cooperative resource management and a respected community presence developed by a professional workforce.

Yampa Valley Alliance

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The Yampa Valley Alliance project was initiated by local community leaders from the cities of Steamboat Springs and Craig as a component of a valley-wide economic diversification strategy. The local economy is very dependent on seasonal tourism associated with Steamboat Ski Area, cyclic coal mining industries and coal-fired electric power plants. The Yampa Valley Economic Development Council (YVEDC) had a study done to identify various strategies for economic diversification, one of which included developing the Routt and Moffat County region as a destination resort in order to tap its enormous potential for year-round tourism. The YVEDC gave the planning and development of the Yampa River Recreation Corridor a high priority among the various strategies identified. The vision of this recreational corridor is focused on a 250-mile system of trails linking recreation amenities from the Flattops Wilderness Area in southern Routt County to Dinosaur National Monument in northwestern Moffat County. The Yampa Valley Alliance was organized to coordinate this project.

The area involved in the Yampa Valley Alliance effort includes the entire Yampa River Basin in northwest Colorado (Figure 1). This area includes approximately 7,000 square miles in Routt and Moffat counties. The planning effort involved natural, cultural and recreation resources under the jurisdiction of private landowners, municipalities of Steamboat Springs, Hayden, and Craig; Routt and Moffat counties; Routt National Forest; Division of Parks and Outdoor Recreation; Division of Wildlife; Dinosaur National Monument; and Bureau of Land Management.

The various representatives of the Alliance initiated a public outreach strategy and planning effort in 1991. Throughout the planning process, the Alliance met with individuals and groups in the valley to encourage the widest possible public input into plan development. Public involvement has been incorporated in all phases of planning by the Yampa Valley Alliance.

Initial public outreach efforts included a luncheon sponsored by one of the local coal mines and attended by representatives of major employers, outdoor recreation organizations, city and county officials, and key individuals from the communities. Individual presentations were made to special interest

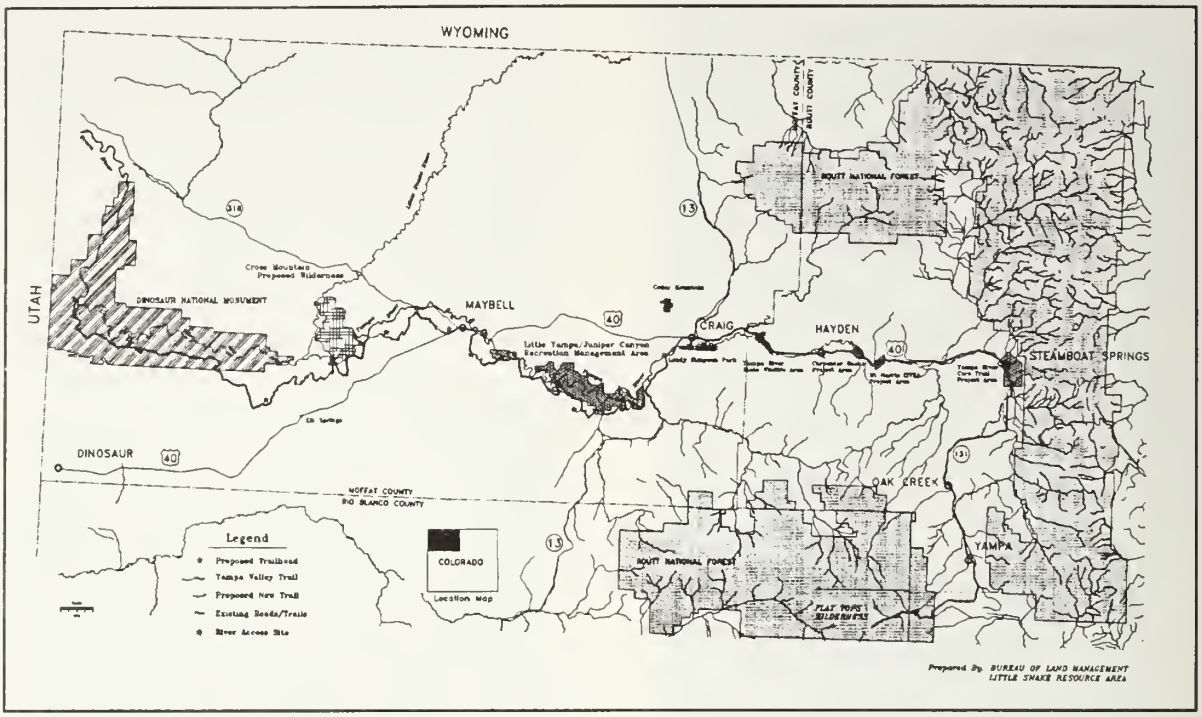

Figure 1. Yampa Valley location map.

groups and informal meetings were held with key landowners and industry representatives in the two county region. A series of public hearings were also held in all primary communities in the valley. Interviews were conducted with representatives from groups and organizations in the categories of Mining and Industry, Farming and Ranching, and Recreation and Tourism in the communities of Steamboat Springs and Craig. Once the draft plan was developed public presentations and open houses were held to gather comments. This process resulted in identification of a variety of issues and concerns which were addressed in final plan development and resulted in a significant level of support by many facets of the public we serve.

The final Yampa Valley Outdoor Recreation Conceptual Plan was completed in March 1993 and outlined recommendations and implementation strategies designed to meet plan goals and objectives. The Alliance is currently focused on implementation of the various plan components which could extend over a 5 to 10 year period. The Alliance partners have successfully negotiated specific agreements for five new access sites along the Yampa River. These agreements involve private lands owned by ranchers, a water district and a major corporation. Acquisition efforts are currently underway for additional river access sites between Craig and Steamboat Springs where public access is still constrained. Construction of the links in the Yampa Valley Trail system that is planned to parallel the Yampa River corridor are also underway.

The Bureau of Land Management has a key role in the effort with an extensive public land resource base that includes three canyon areas along the Yampa River. The Bureau's role is being highlighted through implementation of river management actions, including acquisition of new access sites and construction of trail segments that will provide for over 130 miles of the Yampa Valley Core Trail system. Recreation management actions and facility improvements are also being implemented on Cedar Mountain, a local landmark near Craig.

The collaborative efforts of the Alliance has resulted in procurement of funding from a variety of external sources. Total grant funding has exceeded $860,000 and has included sources such as State Department of Local Affairs Energy Impact Fund, Intermodal Surface Transportation Efficiency Act, Colorado State Trails Program, Great Outdoors Colorado Program, Burlington Resources Foundation and the Moffat County Lodging Tax Panel.

Relationship to BLM Summit Themes: The Yampa Valley Alliance project has been successful promoting collaborative leadership through representation by all the jurisdictions in the valley. The effort is being promoted as a model on regional and national levels as a result of successes achieved through local, state, and federal units of government working cooperatively together to address issues crossing jurisdictional boundaries. Other regions within Colorado have begun to try to replicate the collaborative efforts of the Alliance.

This project will provide new recreation opportunities as well as appropriate management responses that will serve current and future publics. Plan development and implementation is being led by the local city and county governments and is responsive to the interests and concerns of the valley's residents.

This project represents a common vision of how public recreation use and tourism will be managed throughout the valley. Working together with this common vision will contribute to maintaining a healthy ecosystem for the Yampa Valley. The approach used in this project defined the study area as the Yampa River Basin and its tributary basins. Plan development proceeded across jurisdictional boundaries traditionally used by the various agencies and municipalities involved. This approach has resulted in recommendations that will facilitate ecosystem based management.

The partnerships that have been developed through this project and continue to be strengthened will enhance the way we do business. Channels of communication have been opened with our community leaders that were essentially nonexistent prior to this project. This partnership has given us the opportunity to be more visible and responsive to our customers as well as meet and exceed their expectations. The effort required us to demonstrate our ability to be flexible and reach consensus.

Yaquina Head - The Future of the BLM

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Introduction.- Yaquina Head Outstanding Natural Area is located on a one mile long by one half mile wide rocky headland that juts almost due west into the Pacific Ocean. It is made up, in-large part, of inaccessible steep cliffs with only about ten acres at the western tip and limited man made roads and trails being easily accessible. The climate is harsh, windy, foggy and cool year-round as it takes the brunt of the weather coming off the ocean.

An Executive Order dated June 8, 1866, from the desk of then president Andrew Johnson, reserved approximately 23 acres at Yaquina Head for lighthouse purposes. This marked the first modern proposal for use of this striking headland. The Yaquina Head Lighthouse was constructed in 1872 and 73. Now managed by the U.S. Coast Guard, it has been in continual operation since then.

The remaining portions of the one mile long headland was eventually settled, farmed, logged, and quarried. In 1917, commercial quarry operations were initiated. This operation, through a series of ownerships, continued until 1983. The result was a significant alteration of the headland's contours.

Public concern over changes in the headland and the potential threat to the cultural and natural resources of the site led to the signing of two public laws. Public Law 95-450, signed by President James E. Carter, incorporated the Oregon Islands National Wildlife Refuge which provided protection to the offshore rocks and islands at Yaquina Head. Managed by the U.S. Fish and Wildlife Service, the islands are officially classified as wilderness.

Public Law 96-199, passed by the Congress of the United States on March 5, 1980, established the Yaquina Head Outstanding Natural Area, "In order to protect the unique scenic, scientific, educational, and recreational values. . . ." Management of the new area was made the responsibility of the Bureau of Land Management. The BLM was provided management direction by Congress with the following three points made very clear:

BLM was to provide for-

"(A) the conservation and development of the scenic, natural, and historic values of the area;

(B) the continued use of the area for purposes of education, scientific study, and public recreation which do not substantially impair the purposes for

which the area is established; and
(C) protection of the wildlife habitat of the area."

A fourth responsibility for the BLM was the restoration of two quarry sites.

Location.- Yaquina Head is located on the extreme western edge of the North American continent in the United States of America. The general geographic region is called the Pacific Northwest consisting mainly of the states of Oregon and Washington. More precisely, Yaquina Head is located on the western edge of the Coast Range Physiographic Province in Lincoln County Oregon, on the north edge of the town of Newport.

Resources. YHONA provides a truly unique opportunity to experience nature and history together in one small area. California gray whales, a recently delisted threatened species, migrate close to shore and summer in the coves and shallow waters just offshore. Harbor seals haul out and pup on the rocks and beaches. Common murres, cormorants, pigeon guillemots, tufted puffins along with a variety of gulls congregate each year on the near shore islands and mainland for nesting in numbers approaching 15,000. Killer whales occasionally visit, as do great white sharks hunting the harbor seals in the shallows. Three other threatened bird species are also common visitors the American bald eagle, the brown pelican, and the perigren falcon.

At low tide the rocky intertidal shelf is exposed to provide access to one of Oregon's four marine gardens. It is one of the few easily accessible and biologically diverse shores on the Oregon coast.

The cultural resource is dominated by the Yaquina Head Lighthouse. It is the tallest and second oldest working lighthouse in Oregon. Placed on the National Register of Historic Places in 1993, it was opened to the public on June 1, 1994. Along with the marine garden it is the main reason visitors come to YHONA.

The secondary cultural resources includes a native American encampment abandoned over 5000 years before the present. The BLM worked closely with the Confederated Tribes of Siletz during the archaeological investigations of the prehistoric sites at YHONA. The staff at YHONA continues to work closely with the Siletz on interpretation of the native American role at YHONA and conservation issues.

Two large abandoned quarries dominate the site. The quarries, un-creatively called the Upper Quarry and Lower Quarry, are currently of little interest to the visitors, but as this paper is being written the Lower Quarry is being converted to rocky intertidal habitat, accessible to the disabled. The Upper Quarry eventually will become the focal point of an interpretive complex consisting of an interpretive center, wayside exhibits, kiosks, overlooks, trailheads and parking.

As stated above there is something unique about the resources at YHONA. Besides this uniqueness, is the fact that all of this occurs in an area of no more than ten acres that is very accessible to the visitors. This high concentration of resources and visitors has managed to coexist for 14 years.

Visitation. April 1, 1930, Henry Hill First Assistant Lightkeeper at Yaquina Head wrote the following to the Commissioner of Lighthouses:

"This station since the building of the Roosevelt Coast Highway has become the most popular on the coast. Sunday, July 4th, 1926, I had over 3000 visitors and on a number of occasions on Sundays and holidays there have been over 2000 visitors go through the tower. I believe I am conservative in stating that we have 50,000 visitors a year counting those that come on closed days and those that come during closed hours. And (of) this number I would say 30,000 go through the tower."

The headland remained a popular destination even after 1966 when the Coast Guard automated the light, closed the tower and eventually abandoned the few remaining buildings. Visitation reached an estimated 125,000 people in 1981 with projections for as many as 245,000 by 1992. In 1990, the BLM contracted for a study of current and expected visitation. 271,604 people visited in 1988, with visitation projections ranging from 351,677 to 633,560 by the year 2000.

Actual visitation reached 431,000 in 1992, dropped a few thousand in 1993, but is now running 12.5% above 1992 figures. This is in spite of the fact that the only improvements to date are a paved access road and a handi-

capped accessible viewing platform near the bird rookery. Visitation for 1994 is projected at 460,000. If the current rate of increase continues, visitation should reach the high end of projected visits of 633,560 visitors by the year 1997, three years ahead of projections. The unknown factor in this equation is what effect the new tidepools and the interpretive complex will have on these numbers.

Development. The first environmental assessment and management plan for YHONA was completed in 1983. It called for improving visitor access, protecting the existing natural and cultural resources and restoring the quarries. The upper quarry was to become the location of an interpretive center, and parking area. The lower quarry would be turned into fully accessible tidepools. The lower quarry project has become internationally recognized as precedent setting work in the fields of land restoration and handicapped accessibility.

The first development work consisted of cleaning up the wrecked cars and garbage. The remains of 108 years of abuse. This was followed by the construction of a stairway to the Marine Garden, and fences to keep the visitors away from the bird nesting areas. With the fencing was the construction of an accessible viewing platform at the bird rookery. This gave visitors the ability to view and photograph the birds without disturbing them. This has worked so well that birds began nesting on both sides of the fence in 1992 and visitors have left them alone. The first permanent staff was hired at this time to provide protection and interpretation.

The year 1989 marked the beginning of the three phase final development of the site. Phase One consisted of rebuilding the dirt access road and parking area. Visitation more than doubled the first year after this was completed.

Phase Two was the development of the lower quarry area, now named the Quarry Cove Tidepools. Access roads and parking were completed in 1992 and received that years' Oregon Landscape Design Award for restoration of damaged landscapes. The work on the sculpting of the tidepools themselves began in September 1993. The final piece of rock separating the ocean from the development was removed on June 1, 1994, flooding the site. Work will continue through September as roads and trails are completed. When Quarry Cove Tidepools is opened for the public it will be the worlds first man made intertidal system that works as a natural system and is fully accessible. Before this project, the handicapped, the elderly and young children could not visit a rocky intertidal site because of the difficult terrain and potential hazards. Now at Yaquina Head no one will feel left out or have to wait in the car while the rest of the family enjoys this BLM site. The Pacific Congress of Marine Science and Technology, an international organization of scientists and marine area managers, has requested a paper on the research performed and YHONA and its use in management of the site and in particular the lower quarry. In addition the World Congress on Tourism for the Environment has requested a similar paper.

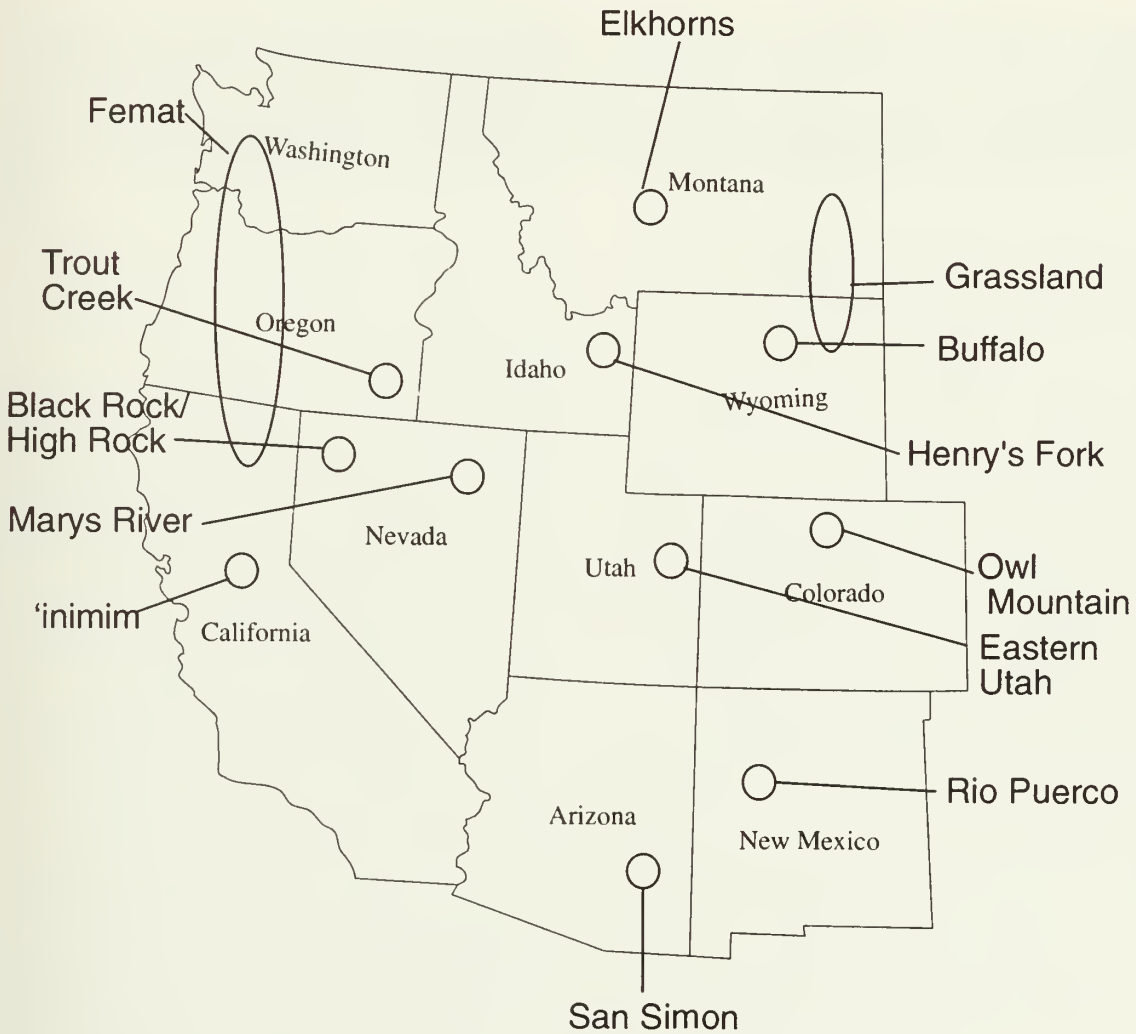
Phase Three is currently in the planning and development stage. The interpretive complex, will include an interpretive center, trails, waysides, overlooks, information kiosks, and covered ramadas. The emphasis will be on orienting the visitors to the site resources and the role BLM plays as the public's "partner in protection" of these and other national resources. The visitor center will serve as an orientation center and give the visitors a brief overview of the themes. The major interpretive elements will be located outside close to the resource, where they will have more effect than in the interpretive center. A major feature of the interpretive complex will be the accessibility of the displays. Signs and displays will have as many tactile and audio components as possible. This provides the opportunity for all visitors to enjoy their visits.

Conclusion.- August 20, 1996 has been set as the dedication day for the opening of the interpretive complex. This will mark the culmination of 16 years of planning and development. The far sighting planning done in 1983 has made Yaquina Head an internationally recognized site and placed the Bureau of Land Management at the forefront of proactive land management and accessibility issues. The BLM is now considered a leader in coastal recreation management, setting the way for other agencies to follow. This is the type of project that showcases the ability of the BLM to meet the needs and concerns of our customers, the American public.

SECTION 2
ECOSYSTEM MANAGEMENT CASE STUDIES

Bureau of Land Management
Summit 1994

Project Locations In the Western States



○ = Approximate location only (not inclusive)

Introduction

The case studies in this section were presented at the BLM Summit on April 27, 1994. The studies, which were part of the session on maintaining healthy ecosystems, are representative of the broad array of challenges and opportunities facing BLM today.

Of the fifty-nine studies submitted, thirteen were selected for presentation at the Summit. (Space and time limitations precluded using all submissions.) Selection criteria were designed to ensure that the studies highlight a cross section of activities throughout the Bureau. The resulting selections illustrate differences in objectives, issues, politics, geographical areas, scales (local, regional, and international), project longevity, types of partners, and other variables in ecosystem management. Each case study is unique, and each provides insight into how cooperative efforts involving diverse individuals and organizations can result in tangible improvements in resource management.

Although they incorporate many key principles, the featured case studies are not perfect models of ecosystem management. Each study has strengths and weaknesses, and there are many lessons to be learned from them. The last section of each case study narrative identifies some of the changes being considered in light of discussions held during the Summit. By reviewing the case studies and learning from them, we hope to improve the application of ecosystem management principles in the future.

Trout Creek Mountain Working Group

Project Description

Location: Southeastern Oregon, Vale District

Size: 523,244 acres; 78 miles of streams; 100% BLM lands

Project Leads: Trout Creek Mountain Working Group
Doc and Connie Hatfield 503/576-2455
Jerry Taylor, Jordan Resource Area Manager 503/473-3144

Start Date: June 1988

Parties Involved: BLM, FWS, Oregon Department of Fish and Wildlife, Ranch permittees, Oregon Cattleman's Association, Oregon Watershed Improvement Coalition, and Environmental Groups

Management Issues: Rehabilitation of watersheds and improvement of riparian areas and fisheries habitat for Lahontan cutthroat trout, a listed T&E species.

Cost Funding Strategy: BLM, permittees, County Grazing Board

Narrative Summary: The Trout Creek and Oregon Canyon mountains are located in the southeastern corner of Oregon straddling the Vale and Burns District boundaries. The area contains rugged and scenic terrain that has very high natural values for wildlife, fisheries and riparian habitat, and such uses as recreation and livestock grazing. It had long been recognized that conflicts were occurring between livestock grazing and natural values such as riparian habitat and fisheries.

For 19 years, the Vale District had studied and documented resource conditions with downward trends. Several documents (e.g. EIS, RPS, HMP) were completed that identified livestock conflicts with riparian habitat in the early 1970s where thousands of willows were planted, trash catcher dams were built, and exclosures and gap fences were constructed to exclude livestock from several sections of streams. Lahontan cutthroat trout were also transplanted into streams devoid of fish. By the early 1980s most willow plantings were gone due to livestock and beaver use and flooding had destroyed a majority of the trash catcher dams. Exclosures built during this

time period proved that riparian habitats were resilient and improvement was possible.

As interest in the area increased and the BLM initiated the riparian management program, pressure to improve resource conditions peaked. The Trout Creek Working Group was formed to bring together environmental groups, ranchers and state and federal agencies as a consensus building team to make a positive difference on the land. Immediate watershed improvement was needed, so the ranchers involved voluntarily removed the cattle from the riparian pastures for a three year period (1989-1991). During the three year rest period, the working group helped the BLM develop a management plan, including range improvements for the Whitehorse Butte Allotment. The working group was also involved in the initial phases of grazing management changes for three other allotments.

Relationship To Ecosystem Management Principles:

Sustain Productivity and Diversity- Working group wanted to improve watershed, riparian habitat and fisheries to benefit Lahontan cutthroat trout while providing for human and cultural values.

Use Best Available Scientific & Technical Information- Federal and state agencies provide technical resource data to integrate into management plan.

Involve the Public/Coordinate with Resource Users- The working group members are involved in strategies to develop a management plan to improve resources and to maintain viable ranching operations.

Determine Desire Future Ecosystem Conditions- BLM coordinates with working group and other affected interests to determine and evaluate desired future conditions.

Work to Minimize and Repair Impacts to the Land- The Whitehorse Butte AMP and forthcoming management plans will provide specifics in management of resources for present and future activities. Development of plan will improve ecosystems and minimize degradation.

Adopt an Interdisciplinary Approach- The BLM has used and will continue to use an ID team to develop solutions to improve ecosystems with consensus from the working group.

Management of Short and Long-term Goals- Management actions in the area are considered at all levels of interest. Actions provide for immediate improvement that will be maintained for the long-term.

Monitoring of Management Plan- Long-term monitoring studies have been established and are being monitored to determine success or failure of plan and to determine changes needed in the plan for long-term.

SUMMARY MATRIX

Principle	Excellent	Good	Poor	Unclear
Sustain Productivity	X			
Best Scientific & Technical Information	X			
Involve Public	X			
Determine Desired Conditions	X			
Minimize Impacts to Land		X		
Interdisciplinary Approach	X			
Long-Short Term Goals		X		
Monitoring	X			

Elkhorns Cooperative Management Area

Project Description

Location: West-central Montana (25 miles south of Helena)

Size: 70,000 acres BLM; 250,000 acres Forest Service; intermingled state and private lands

Project Lead: Joint leadership is provided by the BLM's Butte District, the Helena and Deerlodge National Forests, and the Montana Department of Fish, Wildlife and Parks. Primary BLM contact is Merle Good, Area Manager, Headwaters Resource Area, (406) 494-5059.

Start Date: Memorandum of Understanding signed in 1992.

Parties Involved: Led by the BLM, Forest Service, and Montana Department of Fish, Wildlife and Parks. The University of Idaho and the Forest Service Intermountain Research Station is providing technical and scientific support.

Management Issues: Maintenance and enhancement of wildlife (particularly elk) habitat, quality recreation opportunities, and restoration of riparian habitat, while providing for other uses such as grazing and mining. Achieving "optimum biological diversity based on historical vegetation patterns."

Cost Funding Strategy: Determined year-to-year, based on participating agencies' priorities and budgets.

Narrative Summary: This project is focused on achieving more efficient and effective management of an ecological "island" — the Elkhorn Mountains — through a systematic process of interagency collaboration and sharing of agency resources.

The project landscape encompasses low elevation lands along the Missouri River floodplain and associated tributaries, and extends upward to alpine mountaintops. Vegetation includes grasslands, mixed-grass/shrub, the shrubland/conifer interface, and several conifer types.

Natural fire occurrence and its effect on vegetation succession is the primary ecological function being analyzed. The re-establishment

of a natural successional regime is an important management consideration. A landscape analysis has been completed for the area to identify ranges of natural variation for key ecological parameters, as well as desired future conditions. Based on this analysis, three implementation areas (based upon watershed boundaries) have been delineated within the landscape.

The first of three interagency implementation plans is expected to be completed in FY94. Each implementation plan will integrate activity plan-level decisions for all resources and programs on both BLM and Forest Service lands. Implementation plans will be designed to achieve desired future conditions cost effectively.

Implementation of related decisions will begin in 1994, including adjustments in livestock grazing, vegetation manipulation, and completion of a comprehensive travel management plan.

The three lead agencies are organized at three levels: A steering committee consists of the Butte District Manager, Deerlodge and Helena National Forest Supervisors, and the Regional Supervisor for the Montana Department of Fish, Wildlife and Parks. A management group includes the BLM Headwaters Area Manager, three Forest Service District Rangers, and the Regional Game Manager. Finally, the Elkhorn Implementation Team includes resource specialists from all three agencies and offices.

This project is probably most useful for demonstrating the following: a high level of interagency cooperation and collaboration; development and implementation of riparian management guidelines; evaluating existing vegetation condition, successional pathways, and the natural role of fire; and determining desired future condition for vegetation types on a very large landscape. This project emphasizes landscape-level ecological and management processes.

Relationship To Ecosystem Management Principles:

Sustain Productivity and Diversity- A primary motive for this project is the need to sustain and enhance the productivity and diversity of high value resources — elk and other wildlife habitat, riparian habitat, water quality, livestock forage. It should be noted that the Elkhorns currently support an elk population which probably exceeds the natural range of variation.

Use Best Available Scientific Information- The landscape-level analysis provided previously unavailable information regarding natural fire occurrence and ranges of natural variation in vegetation patterns. The University of Idaho and the Forest Service Intermountain Research Station have been thoroughly involved in establishing a scientific baseline for decisionmaking.

Involve the Public/Coordinate With Other Landowners- A citizens' advisory group with representatives from conservation groups, recreation, landowners/permittees, and industry has been formed to assist the agencies in resolving management issues. An exhaustive mailing list has been developed for distributing project information and notifying the public of activities. Local newspaper and television coverage has been established.

Determine Desired Future Ecosystem Conditions- A landscape analysis has been completed for the area to identify ranges of natural variation for key ecological parameters, as well as desired future conditions. Natural fire occurrence and its effect on vegetation succession is the primary ecological function being analyzed. Implementation plans will be designed to achieve desired future conditions cost effectively.

Work to Minimize and Repair Impacts to the Land- Riparian habitat restoration and the re-establishment of a landscape-level, natural successional regime are important management considerations.

Adopt an Interdisciplinary Approach- This project utilizes interdisciplinary specialists from three agencies and the University of Idaho.

Base Planning and Management on Long-Term Horizons and Goals- Riparian habitat restoration and the re-establishment of a landscape-level, natural successional regime will necessarily require a long timeframe. The participating agencies envision their "new" collaborative working relationship in the Elkhorns to be permanent.

Reconnect Isolated Parts of the Landscape- This project effectively reconnects parts of the landscape which previously were "jurisdictionally-isolated" (but geographically adjoining).

Practice Adaptive Management- The participating agencies have established a long-term monitoring strategy for key resources that may lead to future adjustments in management activities.

Response To Summit Recommendations: At this point, we have completed the landscape analysis and just the first of three implementation area plans/environmental analyses for the Elkhorns CMA. Each effort results in improvements over the last due to what we learn as we go. As we continue this process and start actually implementing ecosystem management on the ground, we will have numerous opportunities to keep telling our story, developing more partnerships, improving our skills in conflict resolution, and especially to do a better job of involving the public. We most definitely recognize the need for professional facilitation, especially in getting the maximum benefit from the Elkhorns Coordinated Resource Management Committee, and as we move more into collaborative decisionmaking. Documentation for this project is also improving as we progress, so that we leave a trail for future work in the Elkhorns as well as develop a process that can be used for other cooperative ecosystem management efforts. Integrating budgets as well as coordinating data bases and GIS technologies between agencies constitute what we consider the most difficult impediments to true cooperative management success. Although we have made some progress in these areas, budgeting and information processing incompatibilities have proven to be major hurdles that must be worked out between agencies on a much grander scale than this one small project. We recognize and totally concur with the recommendations made by the Summit participants and appreciate their interest in helping us improve our project.

SUMMARY MATRIX

Principle	Excellent	Good	Poor	Unclear
Sustain Productivity		X		
Best Scientific Information		X		
Involve Public		X		
Determine Desired Conditions	X			
Minimize Impacts to Land		X		
Interdisciplinary Approach	X			
Long-Term Goals	X			
Reconnect Landscape	X			
Adaptive Management		X		

Grassland Ecosystem Comparison Project

Project Description

Location: Temperate Dry-Steppe Ecosystems of the Northern and Central Great Plains.

Size: Potentially 50,000,000 acres of grassland in the United States.

Project Lead: Division of Applied Resource Sciences with task leads by individual state offices in cooperation with Forest Service, Soil Conservation Service, and National Biological Survey.

Start Date: 1994

Parties Involved: BLM, USDA Forest Service, National Biological Survey, Soil Conservation Service, and the Nature Conservancy in the United States; land management agencies and science organizations in Canada, Russia, Mongolia, and People's Republic of China.

Management Issues: Development of grassland ecosystem management indicators based on comparative analysis of ecosystem structure, ecological status, and past management practices on similar ecosystems in the northern hemisphere.

Cost Funding Strategy: Undetermined

Summary: Grassland ecosystems are at risk throughout North America. Comparable ecosystems, developed under similar landform and climate regimes, exist in China, Mongolia, and southern Russia. Land-use practices have differed considerably between North American and Asian dry steppe ecosystems and these differences are reflected in the ecological status of the respective grasslands.

Vast regions of the Mongolian Plateau have been grazed under nomadic and semi-nomadic animal husbandry systems for many years, are in excellent ecological condition, and could be used as benchmark sites for comparison purposes. The Ecosystem Comparison Project will compare at-risk North American steppe ecosystems with their counterparts in Asia. The objectives are to take a one-time "snapshot" of current ecological status at paired sampling sites using interdisciplinary/ international field teams and a standard sampling proto-

col, prepare a history of land-use practices for the respective regions, and determine ecological status indicators for dry steppe ecosystems.

A pilot effort will be led by Montana State Office for the wheatgrass-needlegrass component of the dry steppe grassland in eastern Montana, western North and South Dakota, and northeastern Wyoming. Comparable dry steppe ecosystems are located in southern Russia, eastern Mongolia, and northern China.

Relationship To Ecosystem Management Principles:

Sustain Productivity and Diversity- The proposal is based on grassland scientists' observations that large areas of temperate dry steppe grasslands in Asia are characterized by sustained productivity and high species diversity. Key areas on the Asian steppe may serve as benchmarks for managing grasslands throughout the dry steppe regions of the northern hemisphere.

Use Best Available Scientific Information- Management goals for grasslands should be based on the best available scientific information, which includes data from like ecosystems developed under similar landform and climate regimes but managed under different socio-political scenarios.

Involve the Public/Coordinate with Other Landowners- The project will directly involve other land management agencies with grassland responsibilities, principally the Forest Service. The Nature Conservancy is involved because of their interest in preserving prairie ecosystems.

Determine Desired Future Ecosystem Conditions- This is the heart of the project. There are virtually no large relict areas left in North America to ascertain the condition of grassland ecosystems managed under alternative management systems. Grasslands on the dry steppes of Asia have been under a nomadic or semi-nomadic system of grazing for many years and therefore may provide a benchmark that could be used to determine future grassland ecosystem conditions in North America.

Work to Minimize and Repair Impacts to the Land- By comparing both the land-use histories and present ecological status of similar grassland ecosystems, we will be in a better position to understand the relationship between past land-use systems and current ecological condition of the systems we are responsible for managing.

Adopt an Interdisciplinary Approach- This project will utilize interdisciplinary teams, composed of physical, biological, and social scientists, to compare land-use histories and ecosystem conditions. The teams will be multi-agency and international in composition.

Base Planning and Management on Long-Term Horizons and Goals- Long-term horizons and goals must be based on ecosystem potential. Monitoring progress towards meeting those goals will require a set of easily obtained, robust quantitative indicators. One of the objectives of this project is to screen possible indicators that could be used for monitoring purposes.

Reconnect Isolated Parts of the Landscape- Grassland ecosystems of North America have been fragmented to a large extent. Large portions of the Asian steppes are unbroken by major development and therefore may provide the model for how fragmented grassland ecosystems might be reconnected.

Practice Adaptive Management- Adaptive management requires a sound approach to monitoring. This project will aid adaptive management of dry steppe grassland ecosystems by developing ecological status indicators for monitoring.

Response To Summit Recommendations:

Several case study participants commented that the scope of the effort should be broadened to include other countries. The Grassland Ecosystem Comparison Project should involve those countries having temperate steppe ecosystems similar to those in the U.S. Eurasian countries include Russia, Kazakstan, Mongolia, and the People's Republic of China. BLM has a good working relationship with China's State Land Administration. We are currently developing a relationship with the Mongolian Ministry of Nature and Environment and have had initial discus-

sions with the Russians. One case study participant suggested we develop a project charter. Other case study participants felt that the project was focusing too closely on vegetation parameters and needed to expand to include analysis of other factors. We have begun a project charter for internal use, and an ecosystem comparison protocol, which will serve as the international agreement for technical purposes. The project charter will receive a thorough interdisciplinary review within BLM to ensure that the project takes a comprehensive, ecological approach to ecosystem comparison. Case study participants also expressed concern about the one-time "snapshot" approach to sampling ecological parameters. Funding limitations prohibit sampling over several years. An alternative is to substitute space for time and collect data from a statistically adequate number of sample sites during one growing season.

SUMMARY MATRIX

Principle	Excellent	Good	Poor	Unclear
Sustain Productivity	X			
Best Scientific Information	X			
Involve Public				X
Determine Desired Conditions	X			
Minimize Impacts to Land		X		
Interdisciplinary Approach	X			
Long-term Goals	X			
Reconnect Landscape		X		
Adaptive Management	X			

Black Rock/ High Rock Interdistrict Management Area

Project Description

Location: Northwestern Nevada

Size: 1,132,000 acres of public land in the Sonoma-Gerlach Resource Area, Winnemucca District, Nevada and the Surprise Resource Area, Susanville District, Cedarville, California.

Project Lead: The lead is shared by the two resource area managers:

Bud Cribley, Area Manager
SONOMA/GERLACH RESOURCE AREA
705 EAST 4th STREET
WINNEMUCCA, NV 89445
PHONE: (702) 623-1500 FAX: (702) 623-1503

Tony Danna, Area Manager
SURPRISE RESOURCE AREA
P.O. BOX 460
CEDARVILLE, CA 96104
PHONE: (916) 279-6101 FAX: (916) 279-2171

Start Date: March 1993

Parties Involved: BLM, Oregon-California Trails Association, Sierra Club, Public Resources Associates, National Park and Conservation Association, Nevada Division of Wildlife, Audubon Society, Nevada Historical Society, Trails West, Friends of Nevada Wilderness, California Association of 4 Wheel Drive Clubs, and Modoc/Washoe Experimental Stewardship Steering Committee.

Management Issues: To manage the multiple uses of the landscape to protect the remote primitiveness, wildlife, vast undisturbed vistas, and vegetative communities similar to those seen by 1850's emigrants.

Cost Funding Strategy: Pooled funding resources of the Winnemucca and Susanville Districts and contributions from outside sources.

Narrative Summary: This project depicts the collaborative working relationship between two BLM resource areas, several local communities, and several regional interest groups. The Surprise RA and the Sonoma/Gerlach RA (two districts, in two states) have collaborated for the past three years on a

project to coordinate management of 1,132,000 acres of public land in the northwestern Nevada Applegate/Lassen segment of the California National Historic Trail.

Local communities in California and Nevada have become very interested in the use and development of integrated management of this area. Several diverse interest groups have formed a coalition to promote the designation of a National Conservation Area for the Black Rock/High Rock Region. These groups include the Oregon California Trails Association, off-road vehicle organizations, Sierra Club, Wilderness Society, Desert Trails Association, and others.

This project identifies the actions of the Susanville and Winnemucca Districts to serve the current and future needs of the public. One of the key issues in the area is preservation of the relatively undisturbed visual landscape surrounding the historic trail. Maintaining the many prehistoric and historic sites is another important objective. These objectives will be interwoven with grazing and mineral management and the promotion of managed visitor use through the Desert Trail Association and other recreational organizations.

Healthy ecosystem management is a primary objective of the cooperative interdisciplinary management plan being developed by the Susanville and Winnemucca Districts. Habitat protection (particularly raptors, desert dace, and big horn sheep reintroduction), protection of the scenic beauty, wild horses, livestock exclusion areas, riparian, water quality, mineral withdrawal are some of the resource issues.

The Black Rock/High Rock Project illustrates that improving the way we do business will require finding more efficient working relationships with diverse groups and agencies. Pooling personnel, joint visitor management, integrated interdisciplinary teams to develop management plans, and the use of GIS to modernize are ways these two resource areas can improve doing business.

Relationship To Ecosystem Management Principles:

Sustain Productivity and Diversity- This effort is needed to meet goals and objectives by managing existing uses of area resources and planning for anticipated increased demands placed on them, while providing for sustained productivity and diversity.

Use Best Available Scientific Information- BLM is currently using recently gathered Ecological Site Inventory data in establishing Desired Plant Community objectives for the area. We are currently working with the U.S. Geological Survey in defining existing mineral resources and with the U.S. Bureau of Mines to establish mineral potential in the project area. We are setting up monitoring in conjunction with the University of Nevada, Reno for the federally listed Soldier Meadows Desert Dace to determine effects of grazing and recreation on this species. All of this information is being compiled and input into Geographic Information Systems (GIS) for efficient data and conflict analysis. We plan on working with the U.S. Bureau of Mines and Terrestrial Ecosystems Regional Research and Analysis (TERRA) group in using GIS to analyze impacts on the ecosystem caused by different activities.

Involve the Public/Coordinate with Other Landowners- This effort was initiated by public users who were concerned about the future of this area. Up to this point all work that has been done has been in close coordination with the public and other landowners or with these parties actually serving as team members in the planning for this project area.

Determine Desired Future Ecosystem Conditions- One of the major stimulants for establishing the project area is the concern of the public about maintaining the ecosystem in light of the steadily increasing demands being placed on resources in this area.

Work to Minimize and Repair Impacts to the Land- A number of the decisions to minimize and repair impacts to the land are being implemented at this time. The plan that we will be developing for this area will fill in those gaps that are still causing problems.

Adopt an Interdisciplinary Approach- This has been done in Multiple Use Decisions that have been issued for portions of the area. The interdisciplinary approach is being used on all new proposed uses in this area. This approach includes full participation by any outside group that expresses an interest.

Base Planning and Management on Long-Term Horizons and Goals- All of the

permitted activities that occur in the project area are allowed in harmony with the long term goals that were set in the Land Use Plans that exist for the area. With the changing demands for this area the existing Land Use Plans are becoming out of date and need to be redone. The Surprise Resource Area and the Winnemucca District are planning to start a combined RMP in FY 96.

Reconnect Isolated Parts of the Landscape- The establishment of this project area, the development of a combined RMP, utilizing an interdisciplinary approach to management, and involving concerned and affected public should lead to the prevention of the fragmentation of the landscape.

Practice Adaptive Management- The BLM is currently managing this area in this manner. Recently decisions have been issued by both resource areas that adjusted use by livestock and wild horses based on both short and long-term monitoring. These decisions also adjusted objectives because monitoring indicated a need for this. We are continuing our monitoring efforts and are adjusting our monitoring as the need is identified.

RESPONSE TO SUMMIT RECOMMENDATIONS:

After reviewing the recommendations made at the Summit we broke them into two categories: those that we feel we are already doing and just did not communicate to the group and those that we can incorporate into our management process. There are three broad items that we will be incorporating:

We will be reviewing the Federal Advisory Committee Act to make sure we are in compliance, considering the groups that are being brought together in developing the management plan for this area.

We are bringing together all of the affected interests and will make them active participants in the management of this area. We will use this group to help formulate common goals for the area and management actions that we want to take. We will involve local government and Native American interests in this group. We are also involving the National Park Service, because has responsibility for the California Trails, and Fish and Wildlife, which manages the Sheldon Antelope Range.

SUMMARY MATRIX

We will continue to develop a management plan for this area and will not allow pending legislation or upcoming long-term planning to slow that process down.

Principle	Excellent	Good	Poor	Unclear
Sustained Productivity		X		
Best Scientific Information	X			
Involve Public	X			
Determine Desired Conditions		X		
Minimize Impacts to Land		X		
Interdisciplinary Approach	X			
Long-Term Goals		X		
Reconnect Landscape		X		
Adaptive Management	X			

'inimim Forest Project

Project Description

Location: San Juan Ridge, Nevada County, California

Size: Total size is unknown; project is still evolving. 1,388 acres of public land committed.

Project Lead: Yuba Watershed Institute

Start Date: 1991

Parties Involved: Bureau of Land Management, Forest Service, State Parks, State Fish and Game, State Department of Forestry, County Board of Supervisors, private landowners, Yuba Watershed Institute, Timber Framers Guild of North America.

Management Issues: Re-establishment of an old growth forest, reduction of a potentially catastrophic wildfire hazard, provision of high-quality timber for use by local small industries, wildlife habitat improvement, aesthetic values, environmental education.

Cost Funding Strategy: - Not known at this time.

Narrative Summary: San Juan Ridge is located in Nevada County. It is about 22 miles long, and runs from the southwest to the northeast. The ridge is about 1,500 feet in elevation at the western end, and about 5,000 feet at the eastern end. The Middle Fork Yuba River forms the northern boundary and the South Fork Yuba River is the southern boundary. The most striking feature of San Juan Ridge is the presence of very large, old hydraulic mining pits.

The natural environment of San Juan Ridge is typical of its elevation in the Sierra Nevada Range. It is mostly a mixed coniferous forest, dominated by ponderosa pine, sugar pine, Douglas fir, incense cedar, black oak, madrone and manzanita. This forest ecosystem is far from pristine—the impacts of gold mining, repeated logging and wildfires are substantial and very apparent. Both agricultural and residential development have badly fragmented available forest habitat.

Land ownership is mixed. The upper end of the ridge is within the Tahoe National Forest, but is a checkerboarded Railroad Grant

area. Much of the lower end is private property, with scattered parcels of BLM-administered land. One of the old hydraulic pits, Malakoff Diggings, is a California State Historical Park.

The 'Inimim Forest project is an unusual cooperative effort, experimental in nature, between the Bureau and the residents of San Juan Ridge. The project is a direct result of local citizens' desire to be included in the land use decisions for Federal lands which may affect their community for years to come. The residents, through the Yuba Watershed Institute, have asked to participate in forming a low-impact multiple-use policy which restores past resource values for both long-term economic and aesthetic reasons. The local community strongly advocates sustainable resource management, and has taken the initiative to achieve this goal.

The Yuba Watershed Institute, joined by the Timber Framers Guild, entered into a Cooperative Management Agreement (CMA) with the BLM to jointly manage the public lands known as the 'Inimim Forest. The primary goal described in the CMA is the re-establishment of a late seral, or old growth forest.

To achieve the objectives of the CMA, the YWI performed a detailed inventory of resources on the 'Inimim lands. This information was then used to formulate a site-specific draft management plan. The plan is currently undergoing review by YWI members. The role of the Bureau is to act as a partner and a coach in the effort.

The YWI is viewing the entire San Juan Ridge area as a single ecosystem. It is their hope to use the public lands of the 'Inimim Forest as an example of what can be done to improve the overall productivity of forest lands. They are in the process of negotiating with the Forest Service and with other private landowners to expand the management strategies developed and tested on the public lands.

San Juan Ridge presents a classic example of the urban-wildlands interface which is becoming increasingly common throughout the west. The 'Inimim Forest project is an exercise in community involvement at the most basic level to develop a sustainable program of low-impact multiple use which will benefit both the local residents and the Federal Government well into the next century and perhaps beyond.

Most importantly, the 'Inimim Forest is an experimental effort in coordinated land use planning at the "grassroots level" that could serve as a model for forest management in other portions of the Sierra bioregion.

Relationship To Ecosystem Management Principles:

Sustain Productivity and Diversity- The driving force behind the 'Inimim Forest is the desire to conserve, maintain and restore the ecological integrity of the forest, and provide for human value, products, and services within the limits of ecological sustainability.

Use Best Available Scientific Information- The inventory of the 'Inimim Forest was achieved with the aid of recognized professionals in natural area management, including specialists from Federal agencies, the State Parks Department, Fish and Game, the University of California, and private forestry. The results were analyzed, and utilized in the formulation of the draft plan.

Involve the Public/Coordinate With Other Landowners- The project was initiated by local landowners, who constitute the YWI. They have been quite active in involving their neighbors. The BLM has assisted them in public involvement by coordinating with local officials and participating in public meetings.

Determine Desired Future Ecosystem Conditions- The CMA between the BLM and YWI carefully defined the desired future condition of the 'Inimim Forest. This was further refined in the draft management plan as follows:

"A century from now, the public lands of the 'Inimim Forest will consist of a mosaic of plant communities, including riparian and chaparral, but mostly consisting of forest stands of different age and species composition. Many forest stands will be managed to produce an open understory, giving a 'park-like' appearance, simulating the presumed prehistoric condition resulting from frequent low-intensity fires. The forest will reflect the effects of

prescribed burns, selective logging, preservation zones, pruning and thinning, and other management practices. The forest would continue to provide habitat for wildlife species that depend on old growth. There will be a steady supply of clear, old growth timber and other forest products from several species of trees, including both softwoods and hardwoods, for use by craftsmen. The quality of life for both Ridge residents and visitors to the 'Inimim Forest will be enriched by contact with the high aesthetic values of the forest."

Work to Minimize and Repair Impacts to the Land- The draft management plan is very specific in the rehabilitation actions necessary to facilitate evolution from a highly impacted landscape into an old growth forest that is both diverse and capable of producing high quality forest products on a sustainable level. The plan also specifies that management activities do not further degrade the environment.

Adopt an Interdisciplinary Approach- An interdisciplinary approach was adopted at the beginning of the project. It never occurred to anyone with the YWI or the BLM to do otherwise.

Base Planning and Management on Long-Term Horizons and Goals- The project began with the identification of long-term goals and objectives. Since the major objective is the re-establishment of an old growth, or late seral forest, the planning horizon is based on a 200-year cycle.

Reconnect Isolated Parts of the Landscape- Participants in the 'Inimim Forest project have taken a holistic view of resource values, and have based the formulation of goals and objectives, as well as the draft management plan, on that approach.

Practice Adaptive Management- Information gathered during the land inventory phase of the project is being arrayed as a baseline, by which changes over time can be identified. An active monitoring program is part of the draft plan. In addition, information on historical land use, including a wildfire history, is being compiled.

Response To Summit Recommendations:

No changes in the 'Inimim Forest Project are planned as a result of the presentation at the Summit.

Marys River Riparian/ Aquatic Restoration Project

Project Description

Location: Elko County, Northeastern Nevada

Size: 520 square miles (80 percent federal, 20 percent private); 250 miles of stream (76 percent federal, 34 percent private)

Project Lead: Bureau of Land Management, Elko District, Bill Baker, Wells Resource Area (702) 753-0200, FAX (702) 753-0255

Start Date: Habitat Management Plan - 1987; Land Exchange - 1991

Parties Involved: Bureau of Land Management (BLM), USDA Forest Service (USFS), Fish and Wildlife Service (FWS), U.S. Geological Survey (USGS), USDA Soil Conservation Service (SCS), National Fish and Wildlife Foundation, state agencies, private landowners, sportsmen's and conservation organizations, ranching and mining industry.

Management Issues:- Restoration of riparian/aquatic habitats vital to the recovery and eventual delisting of the federally listed threatened Lahontan cutthroat trout (LCT).

Cost Funding Strategy:- Appropriations and private donations are being sought to provide matching funds.

Narrative Summary:- This watershed drains into the Humboldt River, which traverses nearly the entire northern half of Nevada. Public lands within the watershed are administered by the Elko District, Bureau of Land Management; national forest lands are administered by the Jarbridge District of the Humboldt National Forest. From the small, high gradient, headwater streams flowing through aspen or cottonwood galleries to the meandering lower reaches of the Marys River, this subbasin is a unique and valuable Great Basin river system. This subbasin is considered to have some of the best Lahontan cutthroat trout (LCT) populations and habitat remaining in Nevada. The LCT was federally listed as an endangered species in 1970 under the Endangered Species Act and was reclassified as a threatened species in 1975 to facilitate management and restoration efforts. The Marys River subbasin is one of the few areas where LCT populations in each stream

are not isolated; potential exists for the populations to interbreed within the subbasin. For these reasons the LCT recovery plan currently being developed by the Fish and Wildlife Service places high priority on restoration of these riparian/aquatic habitats.

In 1982, the Nevada Division of Wildlife prepared an LCT Fishery Management Plan for the Humboldt River Drainage Basin, which provided recommendations and guidelines for the protection and enhancement of the LCT and its habitat in the Humboldt River Basin. The Nevada Division of Wildlife, BLM, FIST, and FWS are all signatory parties to this plan. The Marys River Riparian/Aquatic Habitat Management Plan (HMP) was completed in 1987, outlining management actions to implement BLM's commitment to maintain and improve the quality of public land riparian/aquatic resources along the middle reaches of Marys River and its tributaries. However, the Marys River HMP only addressed management actions on public lands. Because of fragmented land patterns within the watershed, comprehensive watershed recovery could not be realized without similar improvements on other stream segments.

Growing public and private support for habitat improvement and delisting of the LCT resulted in acquisition of critical private land habitat and needed water rights through land exchanges. In 1991, a land exchange was completed with Olympic Management, Inc., allowing for acquisition of 47,000 acres of private land, primarily within the Marys River watershed, in exchange for 660 acres of public land within the Las Vegas city limits. Completion of this has placed increased acres of the Marys River system in public ownership, offering more comprehensive management opportunities. Subsequently, a Marys River Master Plan identified the need for individual program activity plans to develop consistent land management objectives, including riparian habitat improvement. Through development of a comprehensive ecosystem management plan, all programs will establish common objectives and management prescriptions.

Relationship To Ecosystem Management Principles:

Base Planning and Management on Long-Term Horizons and Goals- Long-term ecological objectives will be identified through development of a comprehensive ecosystem management plan for the Marys River watershed to ensure the recovery and sustainability of the ecosystem. Management actions within the Marys River ecosystem will be considered at the local, regional, and national levels. Local management actions will affect regional level management actions within the Humboldt River Basin to delist the Lahontan Cutthroat Trout.

Reconnect Isolated Parts of the Landscape- Ongoing land exchange efforts and comprehensive ecosystem management planning will reconnect isolated portions of the 520 square mile watershed previously managed in a fragmented manner due to ownership patterns. All management activities within uplands and floodplains will consider effects on riparian areas, surface waters, and ground waters within the watershed.

Practice Adaptive Management- Long-term monitoring is currently in place within portions of the watershed and will be incorporated into the comprehensive ecosystem management plan. Monitoring and inventory has been and will continue to be coordinated across administrative boundaries. Monitoring results will be integrated into management decisions, allowing management to be adapted as resource conditions warrant.

Response To Summit Recommendations:

To date, we are planning on developing a short video of the Marys River Ecosystem Project with assistance from external affairs at the NSO. We have scheduled a similar presentation in Elko on June 30, at the request of the Northeastern Nevada Naturalists. The WO has requested a similar presentation during the week of June 20. We held a coordination meeting and field trip with USGS on stream gauges for agency priorities and funding opportunities. We have also met with the Forest Service and the Nevada Division of Wildlife to coordinate monitoring needs and funding concerns. Prior to the Rangeland Reform effort, the Elko District Multiple Use Advisory Council was quite involved with planning and implementation efforts. Once the new Multiple Resource Advisory Councils are formed, they will be brought on board and also involved.

SUMMARY MATRIX

Principle	Excellent	Good	Poor	Unclear
Sustain Productivity	X			
Best Scientific Info	X			
Involve Public	X			
Determine Desired Conditions	X			
Minimize Impacts to Land		X		
Interdisciplinary Approach	X			
Long Term Goals	X			
Reconnect Landscape		X		
Adaptive Management	X			

Owl Mountain Partnership

Project Description

Location: Craig District, Kremmling Resource Area. Owl Mountain, is located in the north central mountains of Jackson County near Walden, Colorado. The area lies within two major watersheds, the Michigan and Illinois Rivers.

Size: 246,000 acre parcel of intermingled ownership.

Project Lead: A steering committee with a project manager from the Colorado Division of Wildlife.

Start Date: 1992

Parties Involved: A steering committee has been formed and includes four area livestock producers (one of which is also a liaison to the North Park Habitat Partnership Program) plus representatives from the Bureau of Land Management, Division of Wildlife, US Forest Service, US Fish and Wildlife Service-Arapaho Refuge, Soil Conservation Service, National Park Service, Colorado Division of State Parks and Outdoor Recreation, Colorado State Land Board, Colorado Division of Forestry, Colorado State University, small landowners, and the environmental community.

Management Issues: The intent of this project is to serve the economic, cultural and social needs of the community while developing adaptive long-term landscape management programs, policies and practices that ensure ecosystem sustainability. Major goals are to: (1) create a partnership that will build trust and teamwork to achieve ecosystem health and resolve resource conflicts while serving community needs; (2) develop and implement an adaptive ecosystem management plan across political, administrative and ownership boundaries; (3) document the implementation process of ecosystem management and communicate knowledge gained from the project to partners and the public. The steering committee has defined (with assistance from involved landowners, community residents, special interest groups, and federal/state/local entities) over 50 specific objectives that will be addressed over the course of the project. These objectives concern social and economic systems, wildlife/livestock conflicts and opportunities, logging, off-highway vehicles, protection of private property rights, opportunities

to sustain agriculture in harmony with natural resources, recreation, threatened and endangered species, and communication and educational opportunities.

Cost Funding Strategy: This effort began in 1992 with funding provided by the Seeking Common Ground Work Group. Funding for fiscal year 1993 included: $47,000 from BLM (including $27,000 from the Seeking Common Ground Work Group); $29,000 from the National Fish and Wildlife Foundation; $15,000 from USFWS; personnel and in-kind services from DOW, CSU, SCS, CSU Extension Service, State Forestry, BLM and USFS. In 1994, contributions will include: approximately $30,000 from BLM; $15,000 from USFWS plus additional monies for riparian project on the Arapaho National Wildlife Refuge; and approximately $20,000 from USFS for inventory efforts. In kind services, including staff time, are again expected from participating agencies as well as individual landowners.

Narrative Summary: There are over 25 ranch operations within the area as well as numerous small ranchettes and homesites. Agriculture, logging and recreation (including outfitting and guiding) provide the bulk of the economic stimulus to communities such as Walden, Gould and Rand. Several sub-committees have been organized to work on inventory efforts, budgetary items, educational opportunities, etc. In addition, four different tours of the project area were held during the fall of 1993 for Assistant Secretary Bob Armstrong (US Department of the Interior), Congressman George Miller, and for the Colorado Ecosystem Partnership group. The steering committee is currently finalizing objectives and action items that will be addressed during the course of the project. Major inventory efforts are scheduled to begin during the 1994 field season. Rancher surveys will be concluded by April 1994. The partnership effort is expected to take at least five years to complete.

Relationship To Ecosystem Management Principles:

Sustain Productivity and Diversity- Initially a project to solve livestock/wildlife conflicts, this project now is probably the best example of an ecosystem oriented project in Colorado. It seeks to preserve the long term productivity of the natural resources as well as the social, cultural and economic productivity and diversity of the area.

Use Best Available Scientific Information- Existing data is being utilized and a collaborative process has been employed to identify data needs for inventory and monitoring.

Involve the Public/Coordinate with Other Landowners- This is one of the strengths of this projects.

Determine Desired Future Ecosystem Conditions- Existing data to be collected in the next year will be used by the participants to determine the desired future condition.

Work to Minimize and Repair Impacts to the Land- This is an implicit part of the considerations in the project.

Adopt an Interdisciplinary Approach- As the project has developed, this aspect has become more and more prevalent.

Base Planning and Management on Long-Term Horizons and Goals- The project has not progressed far enough yet to fully develop this aspect but it certainly is a goal of the participants.

Reconnect Isolated Parts of the Landscape- All ownerships in the geographic area are being considered in inventory, monitoring and planning. Participants are expected to cooperate in the implementation stages.

Practice Adaptive Management- This is a goal. Use is being made of existing information and experience and all participants are eager to share experience with new implementation practices.

Response To Summit Recommendations: The Owl Mountain Partnership has had a steering committee composed of locals and agency personnel since the inception of the project. This committee established a clear and concise set of bylaws and operates by consensus. Owl Mountain has published its first newsletter and distributed it broadly. The newsletter highlighted potential projects identified by local ranchers to meet the partnership's goals and objectives. The partnership has solicited participation from the

Colorado Environmental Coalition and national environmental organizations.

SUMMARY MATRIX

Principle	Excellent	Good	Poor	Unclear
Sustain Productivity	X			
Best Scientific Information	X			
Involve Public	X			
Determine Desired Conditions	X			
Minimize Impacts to Land	X			
Interdisciplinary				
Approach	X			
Long Term Goals		X		
Reconnect Landscape	X			
Adaptive Management		X		

Rio Puerco Watershed Stabilization Initiative

Project Description

Location: Rio Puerco Watershed, central and northwestern New Mexico.

Size: 7,000 square miles; a mosaic of public, private, Indian Reservation, and state-owned land. The Bureau of Land Management administers 15 percent of the watershed.

Project Lead: BLM Albuquerque District
District Manager, Mike Ford, 761-8700, Albuquerque, New Mexico.

Other project/agency leads:
SCS - Ken Lieting, 766-1132, Albuquerque
BOR - Chris Gorbach, 766-3929, Albuquerque
USGS - Allen Gellis, 262-5379, Albuquerque
COE - Fritz Blake, 766-2770, Albuquerque
HUB RC&D - Leon Martinez, 761-4686, Albuquerque
NMED - Dave Coss, 827-2836, Santa Fe
BIA - Tom Remington, 766-2666, Albuquerque
USFS - Jose Salinas, 842-3200, Albuquerque

Start Date: 1994, under the provisions of the Rio Puerco Watershed Act of 1994 (Purpose: To improve quality within the Rio Puerco watershed through the cooperative identification and implementation of best management practices which are consistent with the ecological, cultural, sociological, and economic conditions in the region).

Parties Involved: The Rio Puerco Management Initiative will be managed by the Rio Puerco Management Committee, chaired by the BLM, and will include representatives from the Cuba Watershed Committee; U.S. Bureau of Reclamation (BOR); U.S.Geological Survey (USGS); U.S. Bureau of Indian Affairs (BIA) and Tribal/Pueblo representatives; U.S. Fish and Wildlife Service (FWS); U.S. Army Corps of Engineers; U.S. Soil and Conservation Service (SCS); State of New Mexico, including the New Mexico Environment Department and the State Engineer; local Soil and Water Conservation Districts; Elephant Butte Irrigation District; private landowners; and other interested citizens.

Management Issues: The 7,000 square mile Rio Puerco watershed is the largest tributary to the Rio Grande in terms of area and sediment. Natural resource uses and manage-

ment authorities within the basin are as diverse and numerous as any in the nation. Accelerated, progressive, soil erosion within the basin threatens not only the sustained productivity of the rangeland watershed, but also the middle Rio Grande aquatic system, irrigators dependent on those waters, and the economic foundation of the Mesilla Valley (including El Paso) dependent on Elephant Butte Reservoir. The sediment presents several chronic problems associated with channel maintenance, reservoir storage loss, habitat degradation, and water quality concerns of trace metals, salts, and radio nuclides eroded from the Grants Uranium belt. Agencies and the culturally diverse landowners have invested vast sums in resolving this problem over the past several decades, but never with a coordinated dedication to natural resource definition and cooperative efforts to remedy system-wide problems. Consequently, the problems persist.

Position of major constituents: Everyone wants clean abundant water, and stable productive soils. The basic intent of the Clean Water Act, "To restore or maintain our waters' chemical, biological, and physical integrity," is shared by all. The Rio Puerco was once known as New Mexico's bread basket with water supply and soil tilth to support the reputation. There are now at least one dozen abandoned villages in the basin that were once productive agrarian communities. Many feel that a concerted effort to increase the rate of improvement in the Rio Puerco System will have significant beneficial impacts to the larger Rio Grande System.

A substantial proportion of the rural population is concerned about their ability to maintain a traditional lifestyle with an economy which is natural resource based and dependent upon the productivity of land with multiple ownership. Private landowner involvement and education, using locally acquired and interpreted resource data, can offer these constituents economic resource options that benefit both their personal longevity on the land and also the downstream user. Private parties, as users of public lands, will be key to technology transfer among peers, and spread proper conservation ethics supportive of the public land manager and basin-wide goals.

Watershed understanding would be achieved through a cooperative investigation of the basin, utilizing all historic references, and filling gaps with good science from the best experts available among cooperators. This effort would establish an efficient, consistent monitoring system across the basin. Through the watershed investigation, cooperators would identify areas of greatest potential improvement and implement best management practices to serve as demonstration areas for all cooperators in the basin. The results of these successes would be shared. Resource objective success would spread, and in time water quality would improve, as would rangeland productivity. The coordinated monitoring system could verify this numerically, and the demonstration areas would provide visual evidence of improvement.

Federal and state agencies are in agreement with this approach, realizing it is the only alternative offering an economic, long-term, sustainable means of improving the Rio Puerco watershed situation. It is also agreed that improvement will take long-term commitment, and therefore private landowners are critical to success. Cooperators are looking to BLM efforts in the Cuba area to serve as a springboard for this ethic basin-wide.

Position of major state and federal agencies: The BLM, with responsibility for 15 percent of the watershed, has promoted interagency and community cooperation over the past two years. Public land managers have learned that watershed solutions are not achievable without community cooperation. This theme is in step with BOR plans. BOR desires to minimize sediment and water quality impacts to the Rio Grande, associated riparian areas, and Elephant Butte Reservoir. The Texas Water Commission is very supportive of this strategy. The BIA and FWS have been active and supportive. The USGS is very supportive of the cooperators needed to expand scientific understanding and trends associated with the geology and hydrology of the watershed. The Army Corps of Engineers is concerned with flood control and public safety throughout the drainage basin. U.S. Forest Service (USFS) direction is supportive and cooperative. The SCS has played a key role through prompting enthusiastic involvement of the HUB Resource Conservation and Development Area. These two latter parties bring strong representation of private landowners into the equation. All cooperators have been praised by the New Mexico Environmental Department for initiating work to resolve what they have often

called one of our state's worst surface water problems. Their sister agency, the State Highway Department, has also been involved with channelization problems on State Highway 44 south of Cuba.

Cost Funding Strategy: There is broad based support for cooperative, coordinated watershed management in the Rio Puerco, but the effort lacks long-term coordinated funding across federal and state agency lines, and clear, obligate direction.

Narrative Summary: The Rio Puerco Watershed system historically has been recognized as the biggest depositor of silt into the Rio Grande above Elephant Butte Reservoir. Elephant Butte Dam and Reservoir System were built about the turn of the Century. The reservoir system provides water storage for irrigated agriculture and municipalities below the dam in New Mexico and Texas. The reservoir's water storage capacity and life expectancy have been significantly reduced due to the sediments.

The State of New Mexico, in compliance with the Clean Water Act regulations, identified the Rio Grande below the junction of the Rio Puerco as impaired due to high sediment. Based on USGS gauging station data, the vast majority of the sediment comes from the Rio Puerco System.

The Rio Grande was recently categorized as "most endangered" by American Rivers, and Senator Bingaman has scheduled meetings in New Mexico to discuss management of the Rio Grande. The silvery minnow has been proposed for listing as endangered by the USFWS. The Rio Puerco is a major tributary of the Rio Grande, and coordinated, holistic, ecosystem-based management of the Rio Puerco System would complement management of the larger Rio Grande System.

The vast Rio Puerco Drainage System is a mosaic of land ownership and agency management. No single agency has watershed-wide expertise or management responsibility. It will be imperative that the numerous agencies and individuals with resource management responsibility cooperate and coordinate in the planning and management of the Rio Puerco watershed in order to efficiently achieve common ecological, cultural, sociological, and economic objectives for the entire basin.

Legislation similar to the Zuni River Watershed Act (PL 102-338) would provide the direction for coordinated planning and implementation of management actions throughout the Rio Puerco System.

Relationship To Ecosystem Management Principles:

Sustain Productivity and Diversity- Stabilize existing erosion control structures; complete road maintenance and repair; implement projects identified in existing activity plans. To the extent possible, provide opportunities for local involvement to support rural economic development objectives.

Use Best Available Scientific Information- Through computer modeling and use of geographic information system analyses, determine causes of erosion in the Rio Puerco Watershed. This effort should provide the basis for evaluating the impacts of alternative management actions on erosion rates and water quality. The assistance of Service Center staff is needed to complete modeling.

Involve the Public/Coordinate with Other Landowners- Continue working with the Cuba community on economic development, including the Rio Puerco Watershed Committee; provide leadership in the Interagency Task Force to ensure a coordinated approach to managing the entire watershed as well as downstream considerations; provide data to BOR to support their comprehensive review of existing data on the Rio Puerco Watershed; work with the New Mexico Highway Transportation Department on the channelization project and immediate threats to Highway 44; continue searching for areas in common with the environmental community and public land ranchers; provide periodic updates on actions in the Rio Puerco to the media and internally.

Customer service and on-the-ground actions enhance BLM's ability to better serve the public in the Rio Puerco by providing the human resources to timely respond to day-to-day requests for information, authorizations, and coordination. Staffing the Cuba Field Office will substantially increase field presence and customer contact while completing routine, on-the-ground actions in all resource programs (grazing, riparian, wildlife, forestry, minerals, realty, cultural, recreation).

Determine Desired Future Ecosystem Conditions- Assess the effectiveness of on-the-ground projects, including dam maintenance and construction; riparian implementation: channelization activity; sedimentation; and other ongoing project work affecting the watershed.

Work to Minimize and Repair Impacts to the Land- Complete the condition classification; identify opportunities for improved management; modify riparian management strategy; implement management actions/ projects to improve riparian condition.

Adopt an Interdisciplinary Approach- This project utilizes interdisciplinary specialists from more than 12 major federal and state agencies.

Practice Adaptive Management- The participating agencies have established a long-term monitoring strategy for key resources, which may lead to future adjustments in management activities.

Response To Summit Recommendations:

Participants attending the "Rio Puerco Watershed Initiative" case study at the BLM Manager's Summit concurred across the board with the Albuquerque District's focus, direction and implementation of management actions in the watershed. Though there were no real recommendations for specific changes suggested by the participants, as a result of the questions and comments elicited, the Albuquerque District Resources staff has been asked to revisit the EIS and Allotment Management plans prepared in the 1970s (litigation halted those efforts), to seek additional strategies for enhancing our current grazing reduction and management efforts. Additionally, we plan to dedicate funds to retire portions of the Cuba pipeline and rehab those areas rather than spend those dollars on pipeline maintenance and extension. Our ongoing work in the Rio Puerco progresses with sound science, broad-based partnerships, and on-the-ground activities serving as the foundation for our resource management actions. We continue to monitor to assure that we are able to make positive impacts in the watershed as quickly as possible while, simultaneously, assuring long-term sustainability in the work we have completed.

Planning For Ecosystem Management In Utah

Project Description

Location: Eastern and Southern Utah

Size: The Eastern Utah Resource Management Plan (RMP) includes 3.9 million acres of BLM administered surface and subsurface plus an additional .3 million acres of subsurface estate. The plan will encompass three and affect three more Utah BLM resource areas. The area also includes two units administered by the National Park Service, three National Forest Districts, one Indian reservation, three major state land blocks, and many private landowners.

The Southern Utah RMP includes 2.3 million acres of surface and subsurface estate administered by BLM, .98 million acres under Forest Service administration, .57 million acres of Park Service land, .34 million acres owned by the State of Utah, and .4 million acres in private ownership.

Project Lead: The Bureau of Land Management is the lead for each of these ecosystem planning efforts.

The Canyon Country Partnership will be a major player in the formulation and development of the Eastern Utah RMP. This forum was initiated by BLM to coordinate planning and management actions of all land and resource managing agencies and organizations in the canyon country of Southeastern Utah and adjacent Colorado. This includes excellent participation by county officials. The goal of the partnership is to maintain the basic health and sustainability of ecosystems, and serve the needs of people depending upon such ecosystems for commodity or non-commodity values. This partnership will extend beyond the RMP process and is structured to allow land and resource managers, special interests, and the public to work together toward mutually agreeable solutions to contentious problems resulting from ever increasing demands on the Colorado Plateau. It is truly a grass-roots effort that is receiving support from many of the historically polarized groups in the area.

The Kanab-Escalante RMP effort has involved all the major land and resource management entities from the very beginning of the scoping process during which representa-

tives from Southern Utah State University were invited to act as ombudsmen to begin the communication and planning process.

Start Date: Eastern Utah - 1993, Kanab-Escalante - 1992

Parties Involved: BLM, USFS, NPS, US Army, BIA, Ute Tribe, state agencies, county governments, and private landowners.

Management Issues: Issues in both planning efforts revolve around the fact that Utah is experiencing exploding, often conflicting demands on renewable and non-renewable resources due to increased populations that emphasize outdoor recreational activities. We are at a point where no single agency can provide for all these needs and still maintain diverse, healthy, productive, and sustainable ecosystems.

Cost Funding Strategy: BLM's involvement will be through the Annual Work Planning process. Others are unknown.

Summary: These efforts are aimed toward viewing and managing renewable and non-renewable resources in a holistic manner. Ecosystem planning and management will create visions and opportunities we have not experienced before. Environmental analysis will be conducted wherever impacts lead to the point of limited significance. Agreements reached between BLM and other land management agencies will result in many management actions and policies that will be extended across administrative boundaries. For example, threatened and endangered species habitat will be afforded consistent protection, wild and scenic river recommendations will be consistent, game management areas will be viewed and managed to consider complete life cycles, special designation areas with visitor controls will be consistent, and economic impacts and benefits will be considered in a regional setting.

Relationship To Ecosystem Management Principles:

Sustain Productivity and Diversity- The primary goal of any land-use plan is to provide for sustained productivity and biological diversity. Implementing this proposal will enable BLM to reach this goal by incorporating the economic, social, and resource objectives of land management agencies, various governmental entities, and public interest groups into a single Resource Management Plan for BLM administered lands.

Use Best Available Scientific Information- The planning team is in the process of assembling all the research information that is available about the planning area. The other agencies and organizations that are participating in the planning effort have provided considerable assistance in the identification and collection of research information. This information will be incorporated into the RMP management decisions. We will achieve a fully automated GIS data base for all of eastern Utah which will be shared with a number of Federal agencies, state, and local governments.

Involve the Public/Coordinate with Other Landowners- The organization and structure of both planning efforts provide a process for maximum involvement of the public and other landowners in resource allocation decisions. Participation of this group is essential if this ecosystem planning effort is to succeed.

Determine Desired Future Ecosystem Conditions- BLM will be coordinating across administrative and political boundaries to establish resource planning objectives that will determine future ecological condition. Social and economic sectors will also be considered in setting management prescriptions for the planning area.

Work to Minimize and Repair Impacts to the Land- One of the primary reasons for initiating this planning effort was to involve all the agencies and organizations that are concerned with the overwhelming increase in potentially destructive recreation use that is occurring in eastern and southern Utah. Planning decisions must consider the needs of all these groups so that an acceptable level of use can be established and implemented by all land management agencies.

Adopt an Interdisciplinary Approach- By design, the Bureau planning process which emphasizes agency and public involvement and ownership will ensure that an interdisciplinary approach is used to resolve the planning issues.

Base Planning and Management on Long-Term Horizons and Goals- The completed Eastern Utah and Kanab-Escalante RMP's will serve as a base planning document for the area. The long-term resource objectives will serve as the basis for management decisions that will be needed to ensure sustainability and biological diversity.

Reconnect Isolated Parts of the Landscape- By including this large geographical area, the RMP will facilitate the incorporation of management goals for all the land management agencies into a single document. These common management objectives can then be incorporated into other agency plans as they are developed and/or revised. This process will have the effect of connecting previously isolated parts of the landscape.

Practice Adaptive Management- The Bureau planning system is designed to provide for change and adaptation to new situations and information. Systems for monitoring implementation of plan decisions as well as condition of individual resources are already in place.

Response To Summit Recommendations:

The major change, and it is really a re-emphasis and strengthening, has been to redouble our efforts to develop partnerships at all levels. We are now formally involved with several interagency and inter-state groups interested in various aspects of the Colorado Plateau. The main areas of interest thus far include the geographic definition of ecosystems and sub-units, and social and economic public resource dependencies. These groups invariably broaden their scope of interest as the Initiative is discussed and BLM is keeping an eye out for opportunities to incorporate or expand existing partnerships. Wider participation in this early stage of the Initiative is also paying off in wider and more diverse perspectives being brought to bear on the effort.

SUMMARY MATRIX

Principle	Excellent	Good	Poor	Unclear
Sustain Productivity	X			
Best Scientific Info		X		
Involve Public	X			
Determine Desired Conditions	X			
Minimize Impacts to Land	X			
Interdisciplinary Approach	X			
Long Term Goals		X		
Reconnect Landscape		X		
Adaptive Management	X			

Buffalo Ecosystem Management Planning Prototype

Project Description

Location: The Buffalo Resource Area includes Campbell, Johnson, and Sheridan counties in north central Wyoming, a subregion of the Northern Great Plains Ecoregion.

Size: The Casper District represents a geographic area of approximately 21.4 million acres or roughly the size of the state of Maine. The Buffalo Resource Area, the subject of this paper, represents a total surface area of 7.3 million acres or an area roughly the size of the state of Maryland. The total surface area administered by the Buffalo Resource area is about 800,000 acres or about 11% of the total acreage within the three counties. The federal mineral estate, however, is 4.7 million acres or 64% of the resource area.

Project Lead: The Bureau of Land Management Casper District, Buffalo Resource Area. Project team leader—Bruce Daughton (307) 684-5586.

Start Date: November, 1993—under both the principles of ecosystem management and National Performance Review.

Parties Involved: Wyoming Legislature, Big Horn National Forest, Thunder Basin National Grasslands, Soil Conservation Service, Minerals Management Service, city/county governments in the three county area, conservation districts, University of Wyoming, oil and gas industry, ranchers, farmers, and other private landowners, State of Wyoming, various environmental, business, and conservation groups.

Management Issues: The Buffalo Resource Area includes the Madison Formation—a major aquifer which is affected by coal bed methane development, coal production, agricultural demands and feeds one of the fastest growing communities in the state, the city of Gillette.

The need for adequate water data in order to make sound decisions in mineral development had already prompted the BLM to initiate a water research/data collection plan akin to ecosystem planning. The Cumulative Hydrologic Impact Assessment (CHIA) is a partnership between BLM, Mineral Management Service, and the University of Wyoming Water Resources Division.

The Buffalo Resource Area also was a natural for ecosystem planning because of its unique land pattern which is a cause of constant controversy. The current planning process was unable to keep up with the every changing demands on the land and resources. Therefore there is a need to implement a dynamic plan that could address such problems as:

- Oil and gas leases overlap coal leasing which requires a resolution as to which resource would be developed first. This was traditionally reached by the lessees. Because of increased demands by the market place, and the growing interest in the development of coal bed methane, the lessees are asking the federal government to make the decision.

- Increasing demand for the subsurface mineral, oil and gas, which impacts the private surface owner which is perceived as a lost the traditional property rights.

- Demand for public access which is extremely difficult in this scattered public land pattern. A solution can only be assured through long term projects and partnerships with the public.

Cost Funding Strategy: BLM will support this effort through annual allocation of funds. The project partners will contribute information and share in data to avoid the duplication of efforts with regards to information needs. Fundamentally, the basis for long term information management and resource management and monitoring will be an integral responsibility of all specialists across jurisdictional lines.

Summary or Abstract: An ecosystem approach is applied to the development of a fifty-year land management plan. Key aspects of this process are the landscape ecosystem classification, computer-assisted image processing, and a spatial decision support framework for all land management decisions. The regular and systematic data maintenance of these components will be required to maintain a dynamic information system. This data base will enable managers to more effectively monitor, assess and allocate public land resources while maintaining a sustainable and biologically diverse natural system, a sustainable local and regional economy, and a broad range of public values.

Relationship to Ecosystem Management Principles

The Wyoming Ecosystem Planning Prototype is in response to a network of changes in and out of the federal government. Advances in technology, declining budgets, increased demands by the public and forcing systems to change—both the private and public sectors are reorganizing in order to be more responsive, to become more efficient, to be timely, to be accurate, to be flexible. Adding to these changes are specific demands in this locality which will be addressed further later in this paper. But fundamental to many of the changes is that criteria used for the present 1985 Resource Management Plan no longer meet national standards or that emerging development was simply not contemplated a decade ago. All of this comes at a time when public consciousness has been elevated about the ecosystems and ecosystem management.

Ecosystem Management, according to the White House working group on Ecosystem management, is to apply an ecosystem approach to key areas where there are potentially great long-term environmental, social and economic benefits. It identifies in "simple terms" what ecosystem management means, it states we need to break down BLM barriers and move across boundary lines, ask that we think in the long term, be flexible and to become more involved in helping local communities anticipate and adjust to the natural limits of ecosystem.

These statements imply a sense of balance in the allocation of resources, but it does not exactly define what ecosystem management is. We suggest consideration be given to the definition provided by Eugene P. Odum in his 1975 publication of *Ecology*. He defines ecosystem management as "the management of man and his environment as a whole rather than as separate parts." The simplicity of this statement is key to what we, as a land management agency, are all about. Our history reveals a legacy of program management in a multiple use context. While offering multiple uses on the public lands, however, we customarily allocated use by program. Our mission as an agency has also been singular, or at least perceived by the public as such. Why can't all

the agencies work together is the message we receive at meetings. Adherence to the tenets of ecosystem management would change these basic practices to a holistic allocation of use and land management partnerships.

Moving toward ecosystem management was never a question—it makes sense. The prototype aspect to the initiative stated in this paper is directed to the principles advanced by the National Performance Review team. How can we get back to basics, cut red tape, empower our employees and put the customer first? The basic premise of our effort is to achieve harmony—harmony between man and his environment. This is reflected in balance between people's needs and values for the future, the economic sustainability for the locality in which people derive their livelihood, and the natural system. If kept in balance, sustainability occurs. However, if any one or more of these factors are emphasized, stressed, or ignored, then balance is lost. The result may be protest, environmental degradation, and economic fragility. Granted, this proclamation seems a bit simplistic, but it is very real. Real to those people and cultures that depend upon the land for their very existence. This is our challenge. Our approach, therefore, is comprehensive.

This paper reflects a compliment of efforts evolving simultaneously. Consequently, the presentation needs to reflect on the individual components with a conclusion at the end. To do this, the following format will be used. Briefly, the ecoregional context is explained emphasizing the importance of this effort as a prototype in the region. After that, "performance review," "putting people first," "the decision support model," "the planning document," concluding with "from concept to practice." This format will best address the requirements of these papers as well as provide an in depth awareness of the efforts being made on this project.

The Geography

This component addresses the physical, social, and economic geography of the resource area in context to the Northern Great Plains Ecoregion (Bailey, 1994). Bailey is credited with articulating a northern region of the grassland biome which is roughly bordered on the west by the Big Horn Mountain range north to the Missouri River basin in eastern Montana, south to the Pawnee Grasslands/ South Platte River Drainage, east along the Nebraska panhandle to the Missouri River. This region is actually a subpart to the total grassland biome which extends from central Saskatchewan to Brownsville, Texas. The Buffalo Resource Area represents a subregional unit principly associated with the Powder River watershed. The relationship of this effort to the Northern Great Plains is that of a representative sample of a grassland ecosystem with some uniformity in species composition, landscape and seasonal moisture regimes.

The culture of the resource area and the Powder River region is traditional livestock ranching. Farming with pivot irrigation is emerging but remains the exception to the dominant agricultural use. The land was settled in the late 19th century and the conservative landowners proudly state that they represent the fourth and even the fifth generation that is "making on the land." Communities are small, less than 5,000 population, and generally provide the commercial infrastructure to this agrarian landscape.

Near the end of the 19th century, oil was discovered in the basin. Since the beginning of this century, oil and gas development and most recently, coalbed methane has provided the principle mainstay for those residents not employed by the livestock industry. This oil production is tapering off, but new fields are still being developed. Currently, 43 million barrels of oil are produced in the area. Coalbed methane, while not a dominant industry component, is active and factors significantly into our assessment of the area.

The real change in the region has occurred since the early sixties. The demand for Powder River coal located in Campbell county has changed the economy of the region and the state. The city of Gillette has seen unprecedented growth. Annually, 160 million tons of low sulphur, low ash coal are mined which represents 58% of the federal coal mined in America. Powder River coal provides 55% of the U.S. energy demand for electricity with significant markets in 32 states. 97% of Wyoming's electricity comes from Powder River coal. Coal alone contributes $262 million to the state in the form of taxes and royalties.

The fundamental reason for addressing

these statistics is to acknowledge the order of magnitude of the Powder River basin and the role the Buffalo Resource Area plays in the economic scheme of the region and the nation. To paraphrase Secretary Babbitt, this is one environmental "train wreck" that cannot be allowed to happen! The spotted owl issue would be dwarfed by comparison.

Performance Review

"Customer Service and Back to Basics" were the fundamentals the team looked at to determine what's working and what needs to be revisited. Does our planning process meet the needs of our publics? Are our publics satisfied with the quality of the documentation and decision making? Are the steps we undertake truly meaningful or are they merely steps which satisfy the planning exercise? Is the planning document and decision timely and responsive to change or is it outdated the day it's printed? The past two decades of plan preparation would reveal that we are successful in satisfying our regulation but fail to satisfy the needs of our public as evidenced through the numerous protests and appeals. Finally, how effective is our planning document to support decision making? Are we really realizing the benefits after all the expense?

These are tough questions for an agency which has demonstrated diligence in complying with a multitude of statutes and regulatory mandates. The team went back to our primary statutes and evaluated what was required by statute and what has happened in the regulatory arena. Our prototype is based upon what we have learned from this experience. Secondly, the team has developed methodology which articulates the decision environment—essential to fulfillment of the process. This assessment of our regulation and process has prompted us to challenge many of the "hoops" we jump through. We have not abandoned our planning process but rather looked for ways to get back to basics. This in a continual refinement which will evolve throughout the life of this effort.

Putting People First

This is the fundamental challenge we face in any effort to allocate resources under the tenets of ecosystem management. The perception of our publics is that they believe that ecosystem management is just another administration strategy for a "federal taking of private property rights." For this reason, it was essential to go directly to the public and inform them of what we intend to do. BLM has to rethink what our role is in the community and the ecosystem, who we are doing this for and how can we develop collaborative solutions to resource management.

Our state director went directly to the Congressional delegation to inform them about what we intend to do... and listened to what they had to say. We took those suggestions and have applied them in our coordination and communication for this plan. We also spoke to the State Legislative committee, local conservation districts and industry organizations, state employees, other federal agencies, and even our own people. They all expressed similar concerns.

We identified the mistakes we're made in communicating what we were doing, and developed a video tape to consistently convey information about ecosystem planning. This tape was presented to the State Legislature. It will be used address interest groups and in public meetings. But this is only one part of our strategy. What are people's values regarding the public land and what role do they see for the BLM?

To answer this question, we developed a structured scoping process which would focus response to what BLM does, what we should be doing, and what importance the public places not only on the activity but also by the geography it represents. We contacted people on both a local, regional, and national level to collect opinions. We did the same process internally. We analyzed all the data and drew conclusions as to what we needed to change, and why, but most importantly, what sense of values our publics had regarding the land and us as an agency. The results have been extremely useful in targeting our audiences. It also has encouraged us to assess our own customer practices regarding how we deliver services, confer with our constituents, and develop our priorities.

This is an on-going process of which the greatest rewards have been that we took the effort to go out and talk to people—*and listen.* People clearly want to be listened to about their public lands. Public scoping just doesn't

reach the publics, the silent majority of just plain folks who really care about what we do. The experience gained by the team in doing this has been inspirational in motivating us to meet our commitment to our public. It also is becoming the foundation for future partnerships we believe to be essential to formulating trust and commitment to the use of these public lands.

The Decision Support Model

By way of definition, a decision support model is an interactive process which enables the decision maker to query, model a variety of relevant parameters, to arrive at a range of suitable solutions to an issue. The model is comprised of predetermined attributes and parameters which are the subject of the "study" currently underway. This technique requires technology in the form of spatial data analysis capability on sophisticated computers, good scientific data, classifications and evaluations, and monitoring for verification.

The decision support model is the key to the longevity of the planning process. But employing this strategy requires that we rethink planning from the old paradigm to a structure forum for how decisions will be made. The strategy incorporates a study which represents three principle facets to ecosystem management; social values, ecological suitability, and economic sustainability. Each of these components represent a dynamic data/information system that, when used in concert, becomes the basis for the decision support model.

The social values data model incorporates the needs, attitudes, perceptions, and values of the landowners, interest groups, and general user. This forum for information exchange, monitoring, and collaboration will serve as the basis for determining the "desired future condition" for any geographically represented issue and long term outcome for the public lands. Monitoring through periodic collaboration will determine whether value shifts warrant changes in the desired future condition, and what priorities should be placed on management of the lands.

The economic data model will address information related to productivity of the land, profitability of enterprise utilizing the land, and most importantly, what role BLM has in maintaining a sustainable economy. This model is supported through a contract with the economists at the University of Wyoming. Factors used to model change are being developed. Scenarios will be developed which will allow us to model individual commodity interests and cumulative impacts. As the model matures, decision makers will have information which will articulate the consequence of decision alternatives based upon the predictive nature of the model. This will factor significantly into the overall ecosystem equation.

The ecological model is the information model which reflects the natural system. The data represents both the physical and biological sciences which form the cornerstone to understand the landscape, how it functions, and how it responds to change. The model is being developed through a systematic process which begins with landscapes represented within the resource area. These landtype associations will represent geology, soils, hydrology, and vegetation. Classification of the landtype association will determine boundaries which represent relatively homogeneous components and when subject to change, will respond in a predictable fashion. These become the natural building blocks to the model. The model will not be developed as a watershed, but watershed boundaries will be used for assessments of cumulative impacts.

The data gathered for the landtype associations represents a resolution of data in a range of about 1:50,000—100,000. This scale offers the optimal trade off between regional data and project data. Also, this scale is consistent with the coarse filter level identified by the USFS and is consistent with a State of Wyoming initiative to map multiple resources statewide. Finally, the GAP analysis program through the Heritage Conservation program is using this scale.

As an agency, we manage change resulting from the activities we authorize or from visitor use. We know that all uses are acceptable within some defined threshold before irreversible change occurs. Therefore, our study team will be performing a capability analysis to determine the limits to use of the majority of the activities we administer. This effort is to articulate what activities fit where and how well and why. This process will provide a series of files where the landscape has been clas-

sified according to the capability of the land to support the activity. Emerging from this analysis will be key indicators which will be used to monitor the activity if it should become part of the desired condition.

A second analysis will be to determine the degree of compatibility between activities. This is to determine when and under what circumstances should activities be allowed to occur and to what extent. This provides data for trade offs, which invariably become part of the decision process.

To complete this ecological model, a suitability assessment will be made which essentially sorts through the capability and compatibility files to determine a range of optimum uses which foster biological diversity, restore and reconnect isolated ecological components and is responsive to changes, trends, and desires of the public. The model will satisfy a range of alternatives based upon potential and supported by good science. The model will also reflect BLM's capability to support initiatives within the limitations imposed through appropriations.

This discussion has provided the basic methodology to our "study" phase. This phase is not time dependent but represents the core of our information/monitoring and assessment program into the next century. The strength of this interactive information system will be essential to the balance required to attain a sustainable ecosystem. Having discussed in detail the three major aspects of the decision model, its application will be determined through the planning phase.

The Planning Document

The goal of our planning document is to make decisions on only those actions which require a timely decision for which there is no previous decision and therefore supporting such actions would be out of compliance with national guidelines. This is the case with the leasing of oil and gas. Our decisions will also address anticipated land uses which are new and previously not anticipated in earlier planning documents. Finally, the document will identify appropriate guidelines which will be incorporated into other decision making processes for each of the landtype associations. These guidelines will address the maximum and minimum thresholds necessary to maintain a healthy ecosystem including the economic parameters, and social values.

The use of the planning document and associated EIS will be to satisfy statutory requirements, provide for preferential allocations where clearly resource trade offs had to be made, and address how the decision process will affect all future activities on the landscape. Decisions will therefore be geographic in content and based upon the decision models developed within the study phase.

From Concept to Practice

What is implied here is the shift required in our business practices. A new emphasis is being made to collaborate with our constituents, forming partnerships, and operating for the common benefits through information exchange. Managers will attend local meetings, and meet with a variety of publics on a regular basis in an effort to solicit and collect information on changes in attitudes and values. This could be referred to as monitoring the social system. Data collected will be incorporated into the decision models, refreshing data and making projections as to shifts in values.

Staff, in cooperation with state, counties, and local communities will monitor economic parameters, input data into the data model and determine whether shifts may affect future decisions. This information will be shared with our partners to realize the potential benefits from this investment.

Importantly, staff will monitor data based upon key indicators determined during the study phase and in accordance to the guidelines developed in the planning phase. Each field examination will have a geographic file drawer which addresses the characteristics of the land unit. This information will represent the core of our land management commitment as it represents T&E species, wildlife communities and their interaction within the landscape, and the affects of human use on the land.

In closing, reflect on the methodology, and concepts and the anticipated strengths associated with structuring "how" we do land management. We believe that the process must be comprehensive and our successes will

greatly enhanced through the partnerships we create. Such issues as organizational streamlining, cross funding and other efficiencies also contribute to how work gets done. This strategy is a effort which attempts to incorporate many facets of our working into a focused process capable of addressing the changing times we live in.

Response to Summit Recommendations

The Casper District and more specifically, the Buffalo Resource Area have embarked on a new paradigm for land use planning utilizing an ecosystem approach. This evolutionary process was presented at the BLM Summit. The audience attending this session offered the following responses:

There was overwhelming enthusiasm for our strategies to enhance public involvement. The audience believed that our efforts warranted greater participation of federal agencies. This suggestion was the to first inform other public agencies a to what we are doing and secondly to foster interagency participation at some level regardless of the agency's mission.

The second principle proposed by the audience was to establish a regional forum that would meet regularly to share the growth within our agency on issues common to the region. As with the first principle, this forum should be open to any participating public agency, the ultimate goal being that information, both technical and nontechnical, be shared for our mutual benefit. As an over arching goal, we all are communicating with our publics, and the consistency of the dialogue would be greatly improved via this forum.

[1] Presented at the Bureau of Land Management "Summit" at Incline Village, Nevada, April 27, 1994.

San Simon River Ecosystem Project

Project Description

Location: Southeastern Arizona and Southwestern New Mexico

Size: The watershed covers About 1,966 square miles in Arizona and New Mexico. The Bureau of Land Management administers 49.8 percent of the area, private lands occupy 24.9 percent, the USDA Forest Service administers 9.8 percent, and the National Park Service 0.1 percent.

Project Lead: Safford District, BLM, San Simon Resource Area.

Start Date: 1994, although watershed improvement work has been performed since the 1930s by the Civilian Conservation Corps, BLM, and the USDA Soil Conservation Service (SCS).

Parties Involved: Historically, the project has been supported by the BLM and the SCS. USFS and NPS have opportunities for limited involvement.

Management Issues: The primary management issue is the rehabilitation of the badly eroded San Simon River and the supply of clean water for water users downstream on the Gila River drainage. An associated issue is flood control for the small communities along the Gila River, just downstream of the mouth of the San Simon River.

Cost Funding Strategy:
Unknown

Summary: In the late 1800s the San Simon valley was a broad floodplain covered with grasses. Although the river wasn't a perennial stream, it apparently had water in it much of the year. At about the turn of the century, the San Simon began an erosional cycle that culminated in the formation of a gully 60 miles long, 10 to 30 feet deep and 40 to 800 feet wide.

By 1919, the erosion problem in the San Simon Watershed was recognized in U.S. Senate Document 436 as a watershed needing extensive rehabilitation. The erosional sequence in the San Simon Valley was apparently caused by a number of actions that happened at about the same time: (1) overgrazing by livestock in the 1880s; (2) extended drought broken by intense thunderstorms

(1890s); (3) construction of a drainage ditch from the Gila River up the San Simon Valley in 1883; (4) construction of wagon roads and increased freight use during the early development of copper mines in the area; (5) an earthquake in Northern Sonora, Mexico, in 1887; and (6) construction of the Gila Valley, Globe and Northern Railway (1884).

The rehabilitation of the watershed was begun in the 1930s by the Civilian Conservation Corps (CCC) which operated in the area from 1935 to 1940. The Grazing Service (predecessor of the BLM) and the Soil Erosion Service (predecessor of the SCS) provided soil erosion control projects for the CCC to implement. Hundreds of small watershed projects were constructed to control erosion and some are still functional today.

In the 1950s, the Bureau of Land Management initiated construction of erosion control dams and seedings to rehabilitate the watershed. The last of these structures was built in 1980. The structures, although built for erosion control, also provide flood protection for communities downstream, as well as watershed protection, improved wildlife habitat and increased livestock forage. Two of the main channel structures, the San Simon Fan Drop Structure (built in 1955) and the Barrier Structure (built in 1980) have combined to retain over 23 million tons of silt on the watershed. The areas behind these structures are planted to grasses, shrubs and trees to provide wildlife habitat, watershed protection, and livestock forage. Progress has been made in rehabilitating the watershed, but a cooperative approach could possibly increase the efforts and bring about a more rapid conclusion.

This ecosystem-based project will be increased in scope to include USFS and increased cooperation with SCS, as well as the State of Arizona, county governments, and local citizens. The existing watershed plan will be updated and input sought from the above mentioned entities.

Relationship To Ecosystem Management Principles:

Sustain Productivity and Diversity- The proposal to manage the entire watershed in a cooperative venture will result in continued improvement of the watershed's productivity and an increase in the plant and animal diversity of the area.

Use Best Available Scientific Information- The combination of USFS, BLM and SCS, as well as local groups, will ensure that all scientific information is the best available.

Involve the Public/Coordinate with Other Landowners- Involvement of the land management agencies and local governmental groups and holding public meetings will allow us to meet public needs while improving the watershed.

Determine Desired Future Ecosystem Conditions- BLM will coordinate with the State Land Department, SCS and USFS to determine desired future conditions.

Work to Minimize and Repair Impacts to the Land- BLM will coordinate with the State Land Department, SCS and USFS to determine desired future conditions.

Adopt an Interdisciplinary Approach- People assigned to work on the plan and implementation of the plan will be selected from various backgrounds. It is envisioned that wildlife biologists range conservationists, engineers, watershed specialists, planners and others will work to revise and implement the plan.

Base Planning and Management on Long-Term Horizons and Goals- Effects of the implementation of the plan will consider long-term goals and progress will be measured to achieve those goals. An interdisciplinary group will periodically review the goals and methods chosen to achieve the goals and revise them, if necessary.

Reconnect Isolated Parts of the Landscape- Since most of the near 2,000 square mile watershed will be included, the plan will reconnect isolated parts of the watershed that were previously managed in a fragmented manner.

Practice Adaptive Management: Long-term monitoring will be an integral component of the plan. Goals and progress will be reviewed periodically to see if results are being achieved.

Response To Summit Recommendations: Because the San Simon ecosystem planning effort is just starting, Summit participants did not evaluate the strengths and weaknesses of an existing plan, but provided information and suggestions about what could be done to strengthen the planning effort.

Perhaps one of the most significant recommendations was to evaluate the area to determine its potential in terms of biodiversity before trying to decide what needs to be done in the watershed. This would prevent the setting of objectives that could not be achieved. We have decided to spend more time developing an idea of what the ecosystem should look like before involving the general public. This information would then be used to help educate the publics that will eventually be involved.

The Henry's Fork Watershed Council

A Community-Based Approach To Watershed Protection And Management

Project Description

Location: The Henry's Fork Basin is located in Eastern Idaho and Western Wyoming

Size: The basin encompasses over 2 million acres and over 3000 miles of rivers and streams. The basin includes the southwestern corner of Yellowstone National Park, the western slope of the Teton Mountains which includes a large portion of the Targhee National Forest and interspersed, isolated tracts of Public Land.

Project Lead: Co-Facilitators

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Dale Swensen, Manager Fremont-Madison Irrigation District, P.O. Box 15, St. Anthony, Idaho 83445 208-624-3381

Start Date:

The first organizational meetings were held in July 1994.

Parties Involved:

Federal Agencies

U.S. Army Corps of Engineers
U.S. Bureau of Land Management
U.S. Bureau of Reclamation
U.S.D.A Forest Service
U.S.D.A. Soil Conservation Service
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Geological Survey
U.S. National Park Service (Yellowstone NP)

State Agencies

Idaho Department of Fish and Game
Idaho Department of Lands
Idaho Department of Parks and Recreation
Idaho Department of Water Resources
Idaho Division of Environmental Quality
Idaho Soil Conservation Commission
Idaho Water Resources Board

Local Entities

Fremont, Teton and Madison County Planning and Zoning

Yellowstone, Teton and Madison Soil Conservation Districts

High Country Resource Conservation and development Area

Henry's Fork Foundation
Greater Yellowstone Coalition
Fremont County Farm Bureau
Fremont-Madison Cattlemen Association
Fremont-Madison Irrigation District
Upper Snake River Fly Fishers
Ashton Area Economic Development Council
Teton Valley Economic Development Council
Idaho State University
Ecosystems Research Institute
North fork Protective Association
Island Park Sportsman Association
Idaho Outfitter and Guides
Idaho Rivers United
Nature Conservancy of Idaho
Friends of the Fall River

Tribes
Shoshone-Bannock

Management Issues: As interests in the basin have diversified, the Henry's Fork has sustained increasing pressure to satisfy irrigation demand, hydropower requirements and instream flow need for fisheries and recreation. These issues are the focal points of the Henry's Fork Basin Plan, passed by the 1993 Idaho Legislature. As a result of the Plan, new developments (such as dams, diversions and hydroprojects) and steam channel alterations are now prohibited or restricted on 195 miles of the Henry's Fork and its tributaries. Recommendations in the Basin Plan address such topics as improved water quality, fish & wildlife protection and irrigation water conservation. In order to implement the recommendations and achieve long-term goals in the basin, an innovative, consensus-building process is needed which includes all resources and people in the watershed.

Cost Funding Strategy- Funding for research, long-term monitoring, review of proposed projects and implementation plans will be collective in nature, with equal amounts derived from public and private sectors. Attempts will be made to match donations from the private sector through grants from entities such as the national Fish and Wildlife Foundation. It is anticipated the cohesive management strategies and flexibility in approaches will result from all parties working together.

Summary- At least twenty-two agencies have some form of management or regulatory jurisdiction in the Henry's Fork Basin, which has resulted in fragmented planning and policy decision making. Lack of agency coordination has hindered progress in addressing soil erosion, water management and water quality problems. Citizens and agencies are beginning to recognize the importance of working together, as a rural community, to resolve the ecological problems in the watershed and to work towards a sustainable future for all concerned.

Agency and citizen representatives met through the summer of 1993 to craft a new approach to addressing watershed issues in the Henry's Fork Basin. Private landowners and public land managers were asked to cooperate in resource studies and planning to transcend jurisdictional boundaries, still respecting the mission, roles and water rights of each entity. The **Henry's Fork Watershed Council** is being established to insure the participation of citizens, scientists and agency representatives who live and work in the basin. Two nonprofit organizations — the Henry's Fork Foundation and the Fremont-Madison Irrigation District — are committed to working together as co-facilitators of the Watershed Council, seeking to establish a more collaborative approach to making resource policy in the basin. Professional staff assigned to the Watershed Council by participation groups will assist in research, analysis and public information efforts. The three components groups of the Council will be as follows:

A **Citizens Advisory Group** will be comprised of special and community interests who desire a voice in watershed council affairs. The Group will review agency proposals and plans for their relevance to local need and whether all interests are treated equitably.

The **Technical Team** will take on the role of research coordination and oversight, serving as catalyst for launching needed studies and as peer reviewers for ongoing work in the basin. Duplication of agency research will be avoided through Team guidance, and results of research will be integrated into Council discussions.

An **Agency Roundtable** will be the third component of the Watershed Council with representatives of over twenty local, state, fed-

eral and tribal entities with rights or responsibilities in the watershed. Meeting at regular intervals, the agencies will seek to align their policies and management to watershed resource realities and current public need. Discussions will seek to ensure close coordination and problem-solving among agencies, demonstrating their level of commitment to lasting watershed health. The Watershed Council members have organized themselves into the appropriate working groups and have established internal operating procedures. The Council expects to be fully operational by the fall of 1994. The Council has designed a Draft **Watershed Integrity Review and Evaluation (WIRE)** process for screening potential or proposed projects within the Henry's Fork watershed. The Council is now in the process of testing the WIRE on several real life "test cases". A Watershed Resource Center will be established in a local community to provide a central library, database repository and working place for all those participating in the collaborative watershed program. The Center will also serve the public's need for watershed information and a focal point for Council business.

Relationship To Ecosystem Management Principles

Sustain Productivity And Diversity- By Pulling Together All Of the federal and state agencies as well as local entities and advocacy groups into a community based, consensus building process, the Council will greatly reduce the fragmented management that presently exists in the basin. This will not only reduce direct and indirect impacts to the ecosystem but more importantly accurately access the cumulative impacts of past, present and future development within the Henry' Fork Watershed. The goal is to delineate and manage for an ecologically and economically sustainable resource base. This will greatly improve watershed productivity and ultimately increase the overall biodiversity of the Basin.

Use Best Available Scientific Information- The checks and balances provided by the three component groups will help to ensure integration, cooperation and accountability within basin management. The technical team is made up of professional staff assigned to the Council by participating groups and agencies and provide a wealth of interdisciplinary knowledge essential for good peer review. This group will ensure the technical adequacy of any proposal reviewed by the Council through the WIRE process.

Involve The Public/Coordinate With Other Land Owners- As previously stated, the Henry's Fork Watershed Council is an innovative community based, consensus-building process. The Council was established to ensure the participation of citizens, scientist, advocacy groups and agency representatives who live, work, recreate or have regulatory authority in the Basin in the decision making process

Determine Desired Future Ecosystem Condition- The development of sustainable desired future ecosystem and economic conditions is an integral part of the WIRE process developed by the Council to review any new activity in the basin. The BLM, Forest Service, Idaho Department of Fish and Game, and University scientists will cooperatively develop and provide this information to the Technical Team and ultimately to the entire Council upon request.

Work To Minimize And Repair Impacts To The Land- See the discussion in Principle 1.

Adopt An Interdisciplinary Approach- As Previously Stated, The technical team is made up of professional technical staffs assigned to the Council by their agency or group. This group includes fishery biologists, wildlife biologists, ecologists, hydrologists, geologist, ground water specialists, water quality specialists, economist and many more. The BLM has representatives on both the Technical and Agency Roundtable teams.

Base Planning And Management On Long Term Horizon And Goals- The primary long term goal of the Henry's Fork Watershed Council is to manage toward a healthy, sustainable ecosystem and economy for ourselves and for generations to come. The checks and balances provided by the Community-based approach will ensure that all voices are heard and incorporated into a more collaborative approach to making resource policy in the basin.

Reconnect Isolated Parts Of The Landscape- Since the Watershed Council will be

addressing issues that encompass over 2 million acres, the opportunity for reconnecting isolated remnants of past ecosystems and managing them toward proper functioning condition is potentially very high. As databases are developed, the federal agencies and their GIS capabilities will play a crucial role in delineating and mending ecosystem fragmentation.

Practice Adaptive Management - Within the WIRE review process, the Council will require a monitoring plan for any project receiving Council approval and/or funding. An integral part of this plan will be "closing the feedback loop". If for instance a best management practice is employed, its effectiveness will be periodically reviewed to ascertain its success in meeting the criteria set by the project proponent. If found lacking or ineffective, the BMP will be reviewed by the technical team and the appropriate recommendations made to the Council.

Changes To Be Made Based On Summit Recommendations

The BLM representatives to the Henry's Fork Watershed Council will offer the recommendations to the full council for discussion and inclusion into the internal operating procedures where appropriate.

Summary Matrix

Principle	Excellent	Good	Poor	Unclear
Sustain Productivity	X			
Best Scientific Info	X			
Involve Public	X			
Determine Desired Conditions			X	
Minimize Impacts to Land		X		
Interdisciplinary Approach	X			
Long Term Goals				X
Reconnect Landscape				X
Adaptive Management		X		

Federal Forest Management Within The Range Of The Northern Spotted Owl

Project Description

LOCATION: Western Oregon and Washington and Northern California

SIZE: BLM land - 2.7 million acres
federal land - 24 million acres
total land - 57 million acres

PROJECT LEAD: Elaine Zielinski, OR/WA State Director and Chair of the Regional Interagency Executive Committee (RIEC).

START DATE: Original BLM proposal in western Oregon Draft Resource Management Plans issued August 1992. Full interagency effort initiated at President's Forest Conference, April, 1993.

PARTIES INVOLVED: BLM, FS, F&WS, NMFS and EPA for initial interagency proposal. Additional participation through the RIEC of BIA; NPS; States of Oregon, Washington and California; and three intertribal groups.

MANAGEMENT ISSUES: Old growth forest protection; northern spotted owl listed as threatened species; lawsuits blocking almost all timber sales with significant regional economic effects; concern about and potential listing of other species including marbled murrelet and salmon; conflict among federal agencies' mission and objectives

COST/FUNDING STRATEGY: Plan Development—Diverted people and dollars from other activities in order to work within existing budgets.

Plan Implementation—Some additional funding provided for watershed restoration work and watershed analyses. Requesting additional funding for watershed restoration and analyses and such needs as species survey and management requirements, NPBs research and additional GIS support.

NARRATIVE SUMMARY: The BLM, while simultaneously preparing six resource management plans (RMPs) for western Oregon, attempted to address existing and emerging management issues. Information from a unique BLM alternative designed to enhance biodiversity and from the Interagency Scientific Committee on the Northern Spot-

ted Owl was augmented to develop an ecosystem-based preferred alternative in the Draft RMP/EISs in August, 1992. This was the first known proposed regional plan that considered federal lands as they function in ecosystems rather than in relative isolation.

After the review period for the DRMP/EISs, the President convened his historic Forest Conference in Portland in April, 1993. From this conference came the Forest Ecosystem Management Assessment Team (FEMAT) Report and the associated Supplemental EIS and Record of Decision in April, 1994.

RELATIONSHIP TO ECOSYSTEM MANAGEMENT PRINCIPLES:

This precedent setting regional plan included key characteristics of ecosystem management and several innovative approaches. These characteristics include:

- Emphasis on long-term ecosystem sustainability and species viability, especially as related to dwindling old growth habitat.
- All BLM and Forest Service lands considered in terms of their regional ecosystem function.
- Although initially driven by a few species of interest, the goal is to move away from a species by species approach to an ecosystem approach.
- A strong emphasis on watershed analysis will help develop a better understanding of ecosystem functions across the landscape and support more effective planning and decision making.

The best available science was intensively sought and utilized including work of the Interagency Scientific Committee (ISC), the Scientific Panel on Late-Successional Forest Ecosystems (Gang of Four), the Scientific Advisory Team and the FEMAT. Continued use of science is specified in the plan via an interagency Research and Monitoring Committee.

Unprecedented interagency collaboration was utilized in developing the plan and is central to plan implementation. This provides a unique situation in which all federal agencies share common ecosystem goals and an organization and process designed to promote collaborative planning rather than the traditional propose/criticize approach of land management and regulatory agencies. (An original interagency team of the BLM, Forest Service, Fish and Wildlife Service, National Marine Fisheries Service and Environmental Protection Agency has been expanded to include the Bureau of Indian Affairs, National Park Service, Soil Conservation Service, representatives of each of the three states and representatives of three intertribal groups.)

- In addition to the Regional Interagency Executive Committee, twelve interagency provincial teams will provide a venue for local interests to consider areas of particular interest in a landscape and watershed context.
- Public involvement, while minimal during plan development because of intensive schedule pressures, will be emphasized through a wide variety of implementation processes.
- Designated adaptive management areas will especially provide for public involvement while promoting experimentation and innovation to develop new ways to manage for ecosystem health and commodity production for community economic support.
- Adaptive management in response to changing conditions and new information will be promoted.
- BLM RMPS will be completed to provide more specific management direction for districts consistent with the President's Forest Plan.

MATRIX SUMMARY:

PRINCIPLE	Excellent	Good	Poor	Unclear
Sustain Productivity	X			
Best Available Information	X			
Involve Public		X		
(implement)	X			
(planning)				
Determine Desired Conditions	X			
Minimize Impacts to Land	X			
Interdisciplinary Approach	X			
Long-term Goals	X			
Reconnect Landscape	X			
Adaptive Management	X			

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